DEPARTMENT OF TECHNOLOGY
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AUGUST 10, 1957
VOL. 153 — NO. 6

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

Long distance
Our lines reach all the way back to 1897 . . . when early Independent telephone companies formed a national association to share ideas and experience . . . to keep pace with a fast-changing America. Today, 4,400 Independents own a $2.5 billion stake in America's future — serve more than nine million telephones throughout two-thirds of the entire area of our nation.
September 8-14 is Independent Telephone Week in 11,000 U.S. communities.
60 Years of Growing Service 1897-1957
INDEPENDENT TELEPHONE COMPANIES
helping you reach all America
U.S. Independent Telephone Association
Pennsylvania Building, Washington, D.C.

Published every week on Saturday by TELEPHONY PUBLISHING CORP. 608 S. Dearborn St., Chicago 5, Ill. Subscription $4.00 per year. Entered as second class matter at the Post Office at Chicago, Ill., under the act of Mar. 3, 1879.

Guaranteed Circulation This Issue
12,065 of Which 11,490 Is Paid

INDEPENDENT WEEK

This is a reproduction of ad observing 60th anniversary of USITA to be run in September issues of three national magazines. Independent companies urged to run tie-in newspaper ads during "Independent Telephone Week." See p. 28 for "tie-in" suggestions.

MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING

957

XUM

Right in the middle of the Shenandoah Valley, just 15 miles from the famous Skyline Drive through the Blue Ridge Mountains, is Harrisonburg, Va., with substantially more telephones in service per 100 people than either the state or national ratio. The town of 12,000 population is headquarters for Harrisonburg Telephone Company. Mr. Lester E. Beydler, Commercial Manager, is shown here trying out a new Alcoa® Outdoor Booth.

"NOTHING IN THE TELEPHONE BUSINESS GIVES YOU A BETTER RETURN ON YOUR MONEY,"

reports Lester Beydler of Harrisonburg Telephone Company

"These Alcoa Outdoor Booths are one of the best revenue producers ever developed," says Mr. Beydler. "Here at the Harrisonburg Telephone Company, we have one Alcoa Booth in the Municipal Parking Lot that produces an average of $124.00 a month. Other booths average between $70.00 and $90.00. There are inside booths all around these locations, but the revenue from these existing booths was not decreased at all when we added the booths in several outdoor locations.

"We never have any trouble getting locations for new outdoor booths," reports Mr. Beydler. "As a matter of fact, we have more requests than we are able to take care of. The property owner furnishes the current for the booth. He's glad to do that in return for the increased business he gets."

XUM

"ONCE A WEEK, a man goes around to all the outdoor booths and wipes off the aluminum and glass with a damp cloth," says Lester Beydler. "He sweeps out any trash that may have been dropped on the floor, collects the coins, and no more attention is required for another week."

"VANDAL RESISTANCE of these booths looks good to me," says Chief of Police Julius Ritchie, of the Harrisonburg Police Department. "In these Alcoa Booths, the mounting plate for the instrument can't be removed without a complete disassembly of the booth. It's impossible for a vandal to get good leverage on the telephone with a crowbar."

GET MORE INFORMATION ON ALCOA BOOTHS. Write for free brochure. And ask your jobber to show you the Alcoa Goodwill Kit and how Alcoa Booths can increase your revenue and build customer good will. Aluminum Company of America, 1690-H Alcoa Bldg., Pittsburgh 19, Pennsylvania.

"THE FREE GOODWILL KIT we got with our latest Alcoa Booth contained newspaper ad mats, publicity releases, free envelope stuffers, radio and TV commercials. This material is just the ticket to help us do a bang-up job of advertising these booths to our customers."

WE CHOSE
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ALUMINUM
MILL PRODUCTS
ALUMINUM COMPANY OF AMERICA

Your Guide to the Best in Aluminum Value

THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS

Is your company on the map?

These independent operating companies from coast to coast have bought more than 2100 separate installations of XY® Dial equipment. They did so because, in looking over the field, they found more advantages here than in any other system. There are now XY installations in 46 states and Alaska.

Flexibility is one important reason for this nation-wide acceptance of Stromberg-Carlson equipment.

Whether your exchange serves a small rural community or a large metropolitan center—you can keep expanding your operation *without replacing any equipment*. The plug-in feature of switches and circuit plates makes this easy expansion possible.

Other important advantages of XY Dial Systems are: vertical wire banks that need no care or cleaning; the XY Universal Switch that serves as line finder, selector or connector; the "Fourth Wire" that performs many extra jobs at no extra cost; twin contacts in switches and wipers; and "back-to-back" placement of equipment that saves floor space in your exchange.

If your company is not yet on the map, it will pay you to investigate all the advantages of Stromberg-Carlson equipment. The Stromberg-Carlson representative in your area will gladly send you a copy of Booklet T-2003, which contains full details.

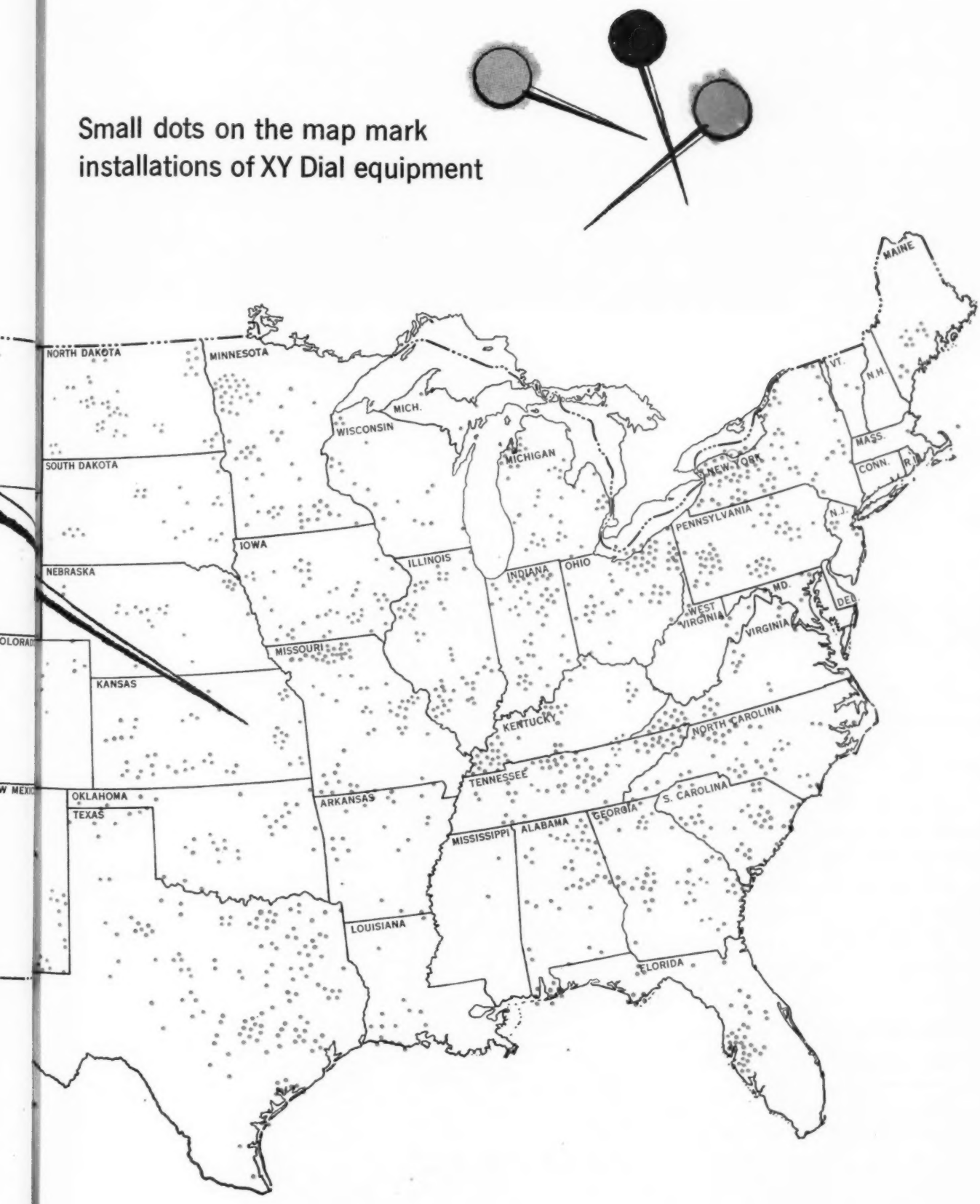
STROMBERG-CARLSON

A DIVISION OF GENERAL DYNAMICS CORPORATION

Sales Offices: Atlanta 6, Chicago 6, Kansas City 8, Rochester 3, San Francisco

XUM

Small dots on the map mark
installations of XY Dial equipment



if you want dial . . .

it's **KELLOGG** for

THE MOST COMPLETE L

CROSSBAR

Crossbar switching allows you maximum expansion . . . requires practically no routine maintenance . . . gives you high traffic capacity . . . has convenient drawer mounted switches which are easily accessible . . . allows PBX grouping service . . . is adaptable to inter-toll dialing.

DID YOU KNOW THAT . . .

Kellogg was first to apply contour formed, printed wiring to replace formed cables, for use by Independents.

STEP-BY-STEP

Step - by - Step switching gives you long life and low cost operation . . . is expandable for increased station and traffic requirements, allows trunking flexibility . . . is easy to check and adjust (each switch is a separate unit) . . . is compact and space-saving.

RELAYMATIC

Relaymatic all-relay switching is simple to install and easy to maintain . . . . operates with any type of trunk line . . . allows you up to 10 party selective divided ringing . . . has adaptors available for grounded rural lines.

XUM

TELINE IN THE WORLD !

Your Kellogg representative is well qualified to help you choose the dial system that best fits your needs . . . only Kellogg offers a complete line of dial equipment to the independent telephone company.

For more detailed information on any of these systems ask your Kellogg representative.

7-A2 ROTARY

Rotary switching gives you the advantages of motor driven, register-type system . . . allows large trunk groups and is adaptable to inter-toll dialing.

PABX'S

For PABX's you have your choice of several types of switching: cross-bar . . . step-by-step . . . or relaymatic . . . in all sizes.

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A Division of International Telephone and Telegraph Corporation

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23 Broderick Road
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OXford 7-5780

1555 West Fourth Street
Mansfield, Ohio
Mansfield 7-2816

1594 Southland Circle, N.W.
Sycamore 4-2441
Atlanta, Georgia

Export Distributor:
International Standard Electric Corp.
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New York 7, New York

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SAVE for YEARS

WITH WB

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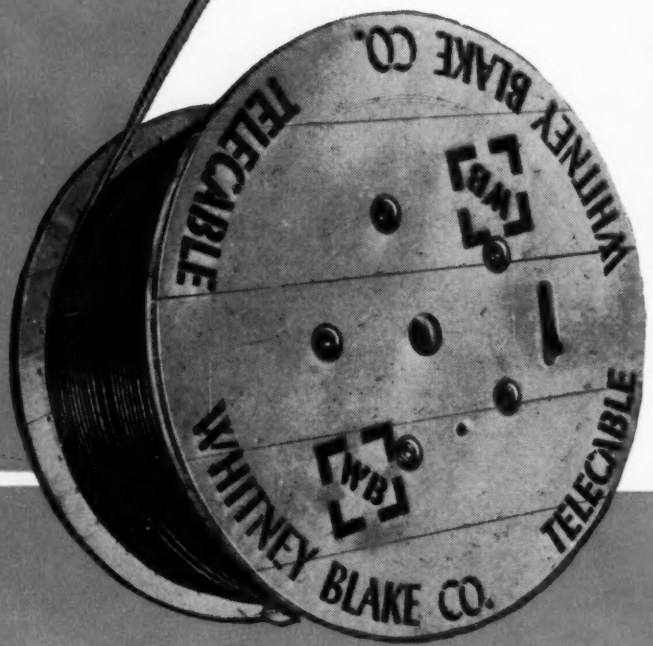


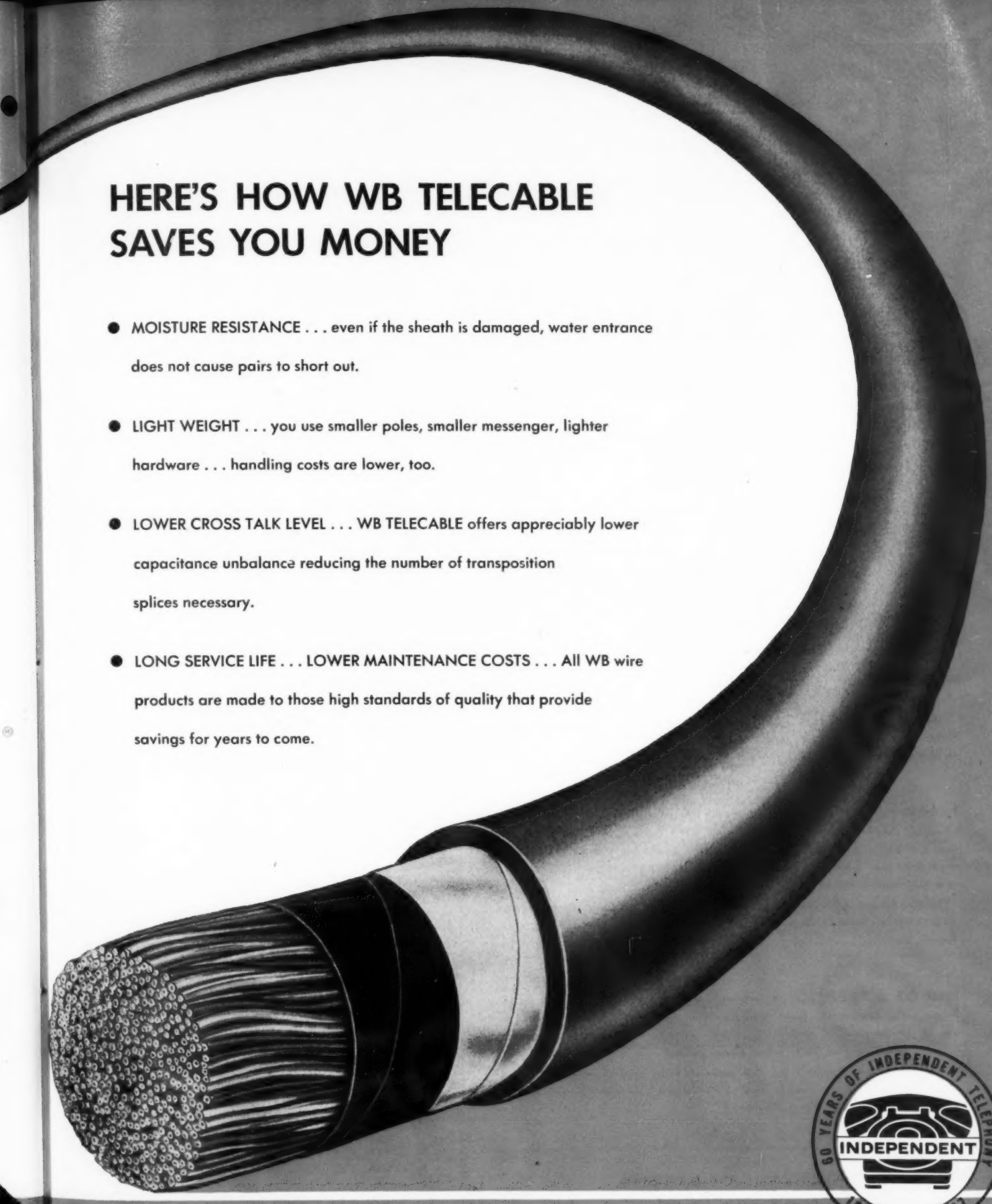
THE STANDARD FOR QUALITY AND SERVICE

WB

WB has that which others have yet to gain . . . EXPERIENCE

HERE'S HOW WB TELECABLE SAVES YOU MONEY

- MOISTURE RESISTANCE . . . even if the sheath is damaged, water entrance does not cause pairs to short out.
- LIGHT WEIGHT . . . you use smaller poles, smaller messenger, lighter hardware . . . handling costs are lower, too.
- LOWER CROSS TALK LEVEL . . . WB TELECABLE offers appreciably lower capacitance unbalance reducing the number of transposition splices necessary.
- LONG SERVICE LIFE . . . LOWER MAINTENANCE COSTS . . . All WB wire products are made to those high standards of quality that provide savings for years to come.



60 YEARS OF INDEPENDENT TELEPHONY
INDEPENDENT
1897 — 1957

Well Built Wires Since 1899

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WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

FLASHES AND PLUGS

RUN ON THE BANK. Down in Springfield, Ill., the folk around a certain filling station were recently speculating about a most amazing man—"the talker," the *Chicago American* reported.

A lonely man, he was, hungry for conversation. He walked into the gas station one day and talked for 24 hours, mostly on the pay telephone to distant cities. He deposited more than $300 in the cash box.

He called Paris. He called Monte Carlo. He called Texas, New York, Wisconsin—Las Vegas, Nev. He talked at length with people in all those places.

Illinois Bell Telephone Co. sent out a serviceman to unload the telephone cash box about halfway through the 24-hour stint. The man kept sending out for more change. Soon all the business houses in the area were stripped of all their nickels, dimes, quarters.

•

THE ROYAL BUDGET. Queen Elizabeth of England is disturbed about the telephone bill at Buckingham Palace which has more than doubled since she came to the throne five years ago.

A raise in telephone rates was announced by the government recently—and the royal telephone bill this year may exceed $70,000.

As an economy measure, the queen has decided not to put through so many costly long-distance calls to her children when she goes on long trips in the future, it is reported.

Also, the queen has had pay telephones installed in Buckingham Palace for the servants so they won't be able to charge private calls to the royal account.

•

FALSE ALARM. A customer recently dialed the number of a Chicago bank. Having a long wait with no answer, he then called the police, reporting that something must be wrong. Police surrounded the building, stormed in. Nothing wrong . . . the lines and the operators were just busy.

Switchboard operators have now been alerted to answer incoming calls with as much dispatch as possible, reports the *Chicago Daily News*.

•

END OF A SKEPTIC. A columnist in the Newark, N. J., *Evening News* tells about an East Orange woman who has long expressed doubt about the accuracy of public opinion surveys and television ratings because she had never been polled.

It seems that neglect by the pulse-takers ended one day recently when her telephone rang and a (subteen) feminine voice asked:

"Do you care for Elvis Presley?"

CHANGE OF ADDRESS

Please notify your local postmaster and the Circulation Dept. of TELEPHONY of change of address. Change cannot be made without the old as well as the new address. Allow three weeks for change of address to become effective.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

August 10, 1957

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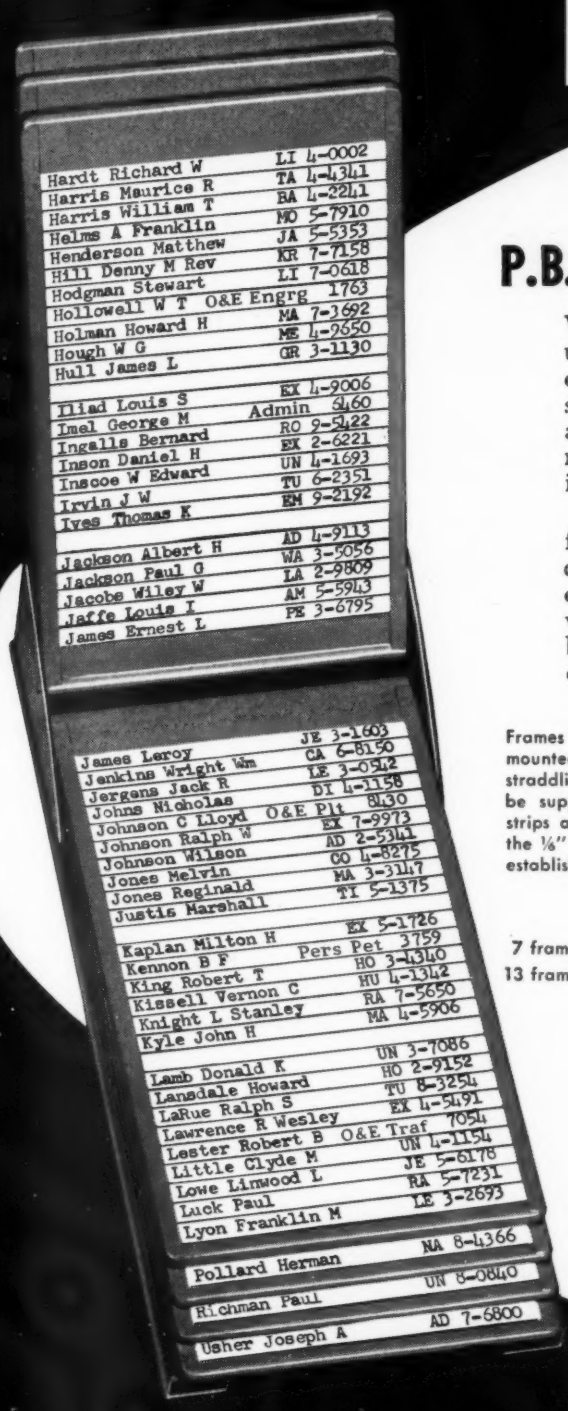
ACME VISIBLE

FLEXOLINE

P.B.X. KEYSHELF DIRECTORY UNITS

With direct distance dialing, it is essential for users of P.B.X. Boards to have a visible record of all frequently called numbers. Flexoline Keyshelf Directory units are specifically engineered and designed for use on P.B.X. boards and furnish the flexibility of individual Flexoline listings on the keyshelf.

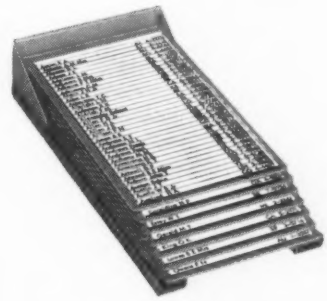
The last Flexoline strip on the front of each frame is *visible* . . . listings may be added or changed without concern for label changing or other indexing detail. The expansion factor within each side of each frame is filled with blank Flexoline strips until each space is wanted for an actual listing.


Hardt Richard W LI 4-0002
Harris Maurice R TA 4-4341
Harris William T BA 4-2241
Helms A Franklin MO 5-7910
Henderson Matthew JA 5-5353
Hill Denny M Rev KR 7-7158
Hodgman Stewart LI 7-0618
Hollowell W T O&E Engrg 1763
Holman Howard H MA 7-3692
Hough W G ME 4-2650
Hull James L GR 3-1130
Iliad Louis S EX 4-9006
Imel George M Admin 5460
Ingalls Bernard RO 9-5422
Inson Daniel H EX 2-6221
Inscoe W Edward UN 4-1693
Irvin J W TU 6-2351
Ives Thomas K EM 9-2192
Jackson Albert H AD 4-9113
Jackson Paul G WA 3-5056
Jacobs Wiley W LA 2-9809
Jaffe Louis I AM 5-5943
James Ernest L PE 3-6795
James Leroy JE 3-1603
Jenkins Wright Wm CA 6-8150
Jergens Jack R LE 3-0542
Johns Nicholas DI 4-1158
Johnson C Lloyd O&E Plt 8130
Johnson Ralph W EX 7-9973
Johnson Wilson AD 2-5341
Jones Melvin CO 4-8275
Jones Reginald MA 3-3147
Justis Marshall TI 5-1375
Kaplan Milton H EX 5-1726
Kennon B F Pers Pet 3759
King Robert T HO 3-4340
Kissell Vernon C HU 4-1342
Knight L Stanley RA 7-5650
Kyle John H MA 4-5906
Lamb Donald K UN 3-7086
Lansdale Howard HO 2-9152
LaRue Ralph S TU 8-3254
Lawrence R Wesley EX 4-5491
Lester Robert B O&E Traf 7054
Little Clyde M UN 4-1154
Lowe Linwood L JE 5-6178
Luck Paul RA 5-7231
Lyon Franklin M LE 3-2693
Pollard Herman NA 8-4366
Richman Paul UN 8-0840
Usher Joseph A AD 7-6800

Frames are aluminum and are removable. Non-skid corrugated rubber strips are mounted on the underside of the base, which is of "bridge" construction for straddling divider strips on switchboards. (When specified, flat base units will be supplied, with over-all corrugated rubber attached to bottom.) Flexoline strips are furnished in sheets of 42 strips per sheet, pre-scored horizontally to the ⅛" standard typewriter space. Supply of Flexoline is included to completely establish the reference listings and accommodate listing changes.

FOUR SIZES

7 frame units with 390 or 490 listings capacity
13 frame units with 712 or 890 listings capacity



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T-8-10-57

Please send us illustrated booklet

☐ #1088 on Acme Switchboard Keyshelf Units ☐ #975 on Acme Flexoline

☐ Have representative call. Date_____ Time_____

☐ We are interested in Acme Visible equipment for_____ (KIND OF RECORD) records.

COMPANY_____ ATTENTION_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

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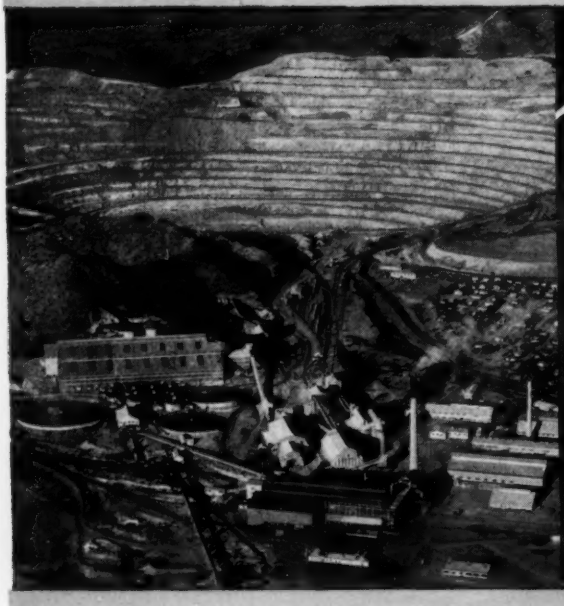
Now... A Complete Line of Telephone Wire and Cable with the Famous Phelps Dodge "Mine-to-Market" Name!



- Highest grade copper from Phelps Dodge's own open-pit mines.
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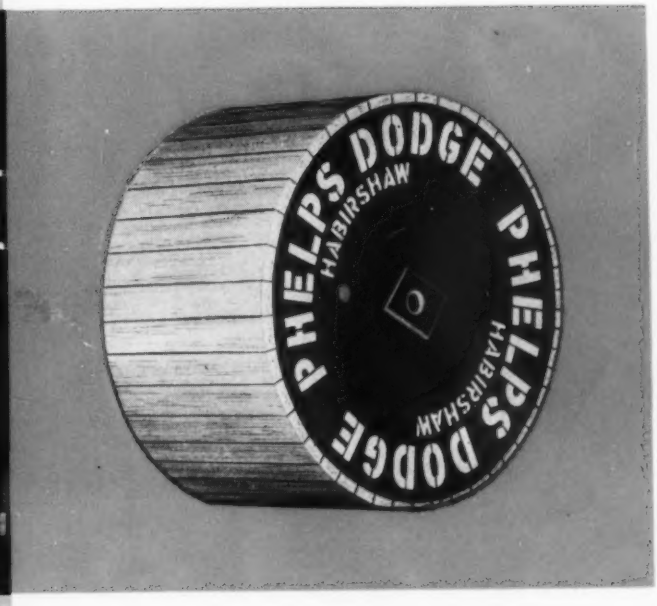
- Careful control of quality throughout fabrication to meet the most exacting specifications.
- Years of manufacturing experience in the communications field.
- Complete line of paper and plastic insulated telephone wire and cable to serve your needs.



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with a purpose...

For sheer beauty the one-piece, free form design of the North Ericofon stands alone!

In addition to its decorative beauty, the Ericofon has a functional beauty — beauty with a purpose!

The one-piece, upright design makes it lighter, more compact for space-saving efficiency, and puts the dial in the bottom for greatest dialing ease — only in the Ericofon do you have "dial-comes-to-you" convenience.

The Ericofon is truly a beautiful instrument!

To offer your subscribers the Ericofon is to compliment them!

To offer you the Ericofon is our privilege!

NORTH ELECTRIC COMPANY

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INCREASE YOUR PROFITS!

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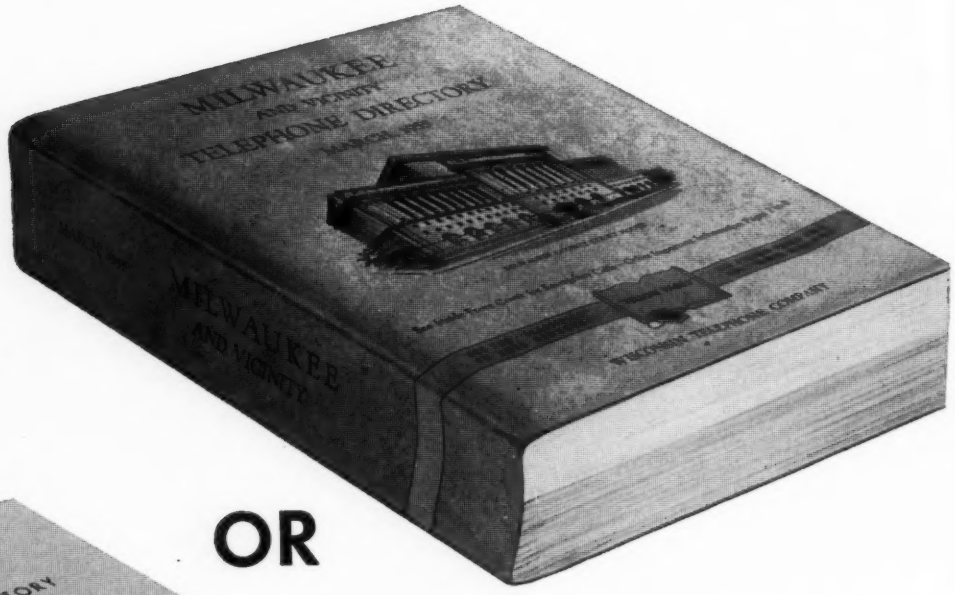

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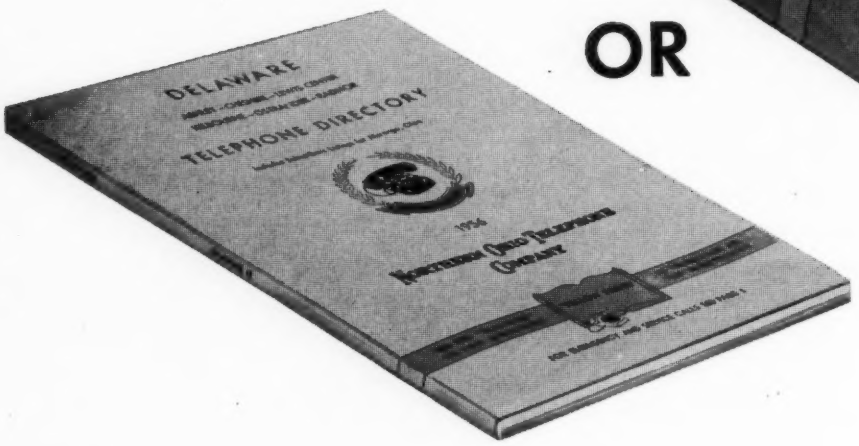

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XUM

IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

Southern Bell wins round in controversial Tennessee rate case. Summarizes REA repayment record. Endorses advice of college professor in face of need for articulate defenders of free competitive enterprise. Answers inquiries about how telephone companies fit into pay TV picture.

SOUTHERN BELL Telephone & Telegraph Co. has won a round in one of the most controversial telephone rate cases in recent months. And, it was an important round—possibly a decisive one—although not the end of the case.

The round was won in the Tennessee Supreme Court which is as high as such a rate case can go when it is appealed from the state commission. The court's decision in this telephone rate case permits the Southern Bell company to continue the rate increases that appeared on subscribers' bills several weeks ago. Those increases were put into effect under bond to cover refunds which would have been required had the court not allowed the increase.

The court said the Tennessee Public Service Commission erred when it refused to take additional proof after it granted only a part of the 9.8-million-dollar annual increase asked by the company in 1954. The newest increase totals $6,803,100, the difference between what the company originally asked for and what the commission granted.

The court said, however, "the commission should and can when . . . it desires to do so, have a new rate hearing and establish a new rate which should be fair and reasonable both to the telephone company and to the users of the telephone."

Public Service Commissioner John C. Hammer said, "We certainly will abide by the decision."

The commission's decision, handed down Jan. 6, 1956 (12 PUR3d 170), featured wide variations between testimony and conclusions of the company's expert witness, H. T. Hatfield, and the commission's witness, Arnold H. Hirsch.

The commission generally followed Mr. Hirsch's conclusions, refusing to consider any reproduction cost rate base evidence, excluding construction work in progress from the rate base, cash working capital from the rate base, assuming that the company had a 45 per cent debt in order to lower the cost of capital requirements, and allowing (on a prudent investment rate base) a return of 6.1 per cent.

The company contended that, even using a prudent investment rate base, the disallowances made by the commission were such that the return fell considerably below the ostensible amount.

Some time after the order, the company wanted to produce evidence that the rates would not yield even the return amounts allowed. The commission refused to consider this, and it was this ruling that the state supreme court found to be in error.

REA Repayments

Figures for the fiscal year which ended July 1, 1957, show that since its rural telephone program started in 1949 there have been 551 telephone borrowers with loans totalling 230 million dollars. Of this amount, borrowers have paid back to the government 7.9 million dollars, including 4.3 million dollars on principal and 3.2 million dollars of interest. The difference of $410,000 represents payments made ahead of due dates.

Twenty-three of the 551 borrowers, however, were delinquent in payments amounting to $504,000. In other words, the delinquent REA telephone borrower's default was greater in dollar amount than the payments made ahead of due dates by other borrowers.

This is just the opposite of what happened in REA's rural electrification program. In that area, rural electric borrowers have obtained almost 3 billion dollars in REA loans during the 23 years of the REA rural electrification program.

The exact figures as of the end of the fiscal year are 2.9 billion dollars borrowed and 862.9 million dollars repaid on rural electrification loans. Of this amount 468.5 million dollars were paid on principal and 285.5 million dollars were paid in interest and 108.9 million dollars were paid ahead of due dates.

Out of the total rural electrification borrowers, 988 in all, only nine were in arrears, the amount overdue being $200,600. This amount is less than half of the telephone loan delinquency.

This comparison is quite striking when one considers the much greater amount loaned on rural electrification programs. In other words, although REA has loaned out 13 times as much money for rural electrification as it has for rural telephone projects, the rural electrification delinquency amounts to only .00007 per cent. The telephone loan delinquency on the other hand is .023 per cent.

The state by state breakdown on telephone loans as of the end of the fiscal year together with the amount is as follows:

State	*No. of Loans*	*Amount*
Alabama	4	$ 1,113,000
Arizona	2	3,006,000
Arkansas	7	2,392,000
California	2	999,000
Colorado	2	1,815,000
Connecticut	—	—
Delaware	—	—

Florida	1	1,113,000
Georgia	10	2,490,000
Idaho	2	771,000
Illinois	8	4,007,000
Indiana	5	1,999,000
Iowa	9	7,291,000
Kansas	16	4,531,000
Kentucky	8	2,801,000
Louisiana	9	2,285,000
Maine	6	1,762,000
Maryland	—	—
Massachusetts	—	—
Michigan	2	503,000
Minnesota	12	4,595,000
Mississippi	5	1,459,000
Missouri	11	3,714,000
Montana	6	2,146,000
Nebraska	3	1,212,000
Nevada	—	—
New Hampshire	1	220,000
New Jersey	—	—
New Mexico	1	52,000
New York	1	227,000
North Carolina	4	1,219,000
North Dakota	8	4,759,000
Ohio	2	380,000
Oklahoma	7	1,415,000
Oregon	4	1,666,000
Pennsylvania	3	2,672,000
Rhode Island	—	—
South Carolina	3	888,000
South Dakota	2	1,121,000
Tennessee	7	1,795,000
Texas	29	7,421,000
Utah	—	—
Vermont	—	—
Virginia	4	2,575,000
Washington	1	72,000
West Virginia	2	210,000
Wisconsin	10	2,574,000
Wyoming	2	459,000
Alaska	—	—

Socialism vs. Businessmen

American businessmen, as well as a number of other people, are notoriously opposed to socialism. But they are frequently unsuccessful in meeting the argument of the opponents of free enterprise. Who says so? None other than Dr. Austin de la Salle Murphy. He is professor of American Enterprise at Canisius College, Buffalo, N. Y.

Dr. Murphy is one of the few college professors concerned with the defense of the business system—that is what he teaches. He thinks that businessmen need help in this department. He recommends discussion groups as a means of training them in the battle of ideas with the socialists.

Dr. Murphy gave this advice to the United States Chamber of Commerce recently:

"From my experience on panels, I have been acutely aware for a long time of the general inability of representatives of competitive enterprise to cope successfully in public debates and discussions with the rapid-fire, quasi-intellectual sophistries of their antagonists.

"The latter frequently include public commentators, research staff members of certain national organizations, government bureau chiefs and politicians.

"Against sophistry, calculatingly presented in loaded words and emotional appeals, the typical businessman is often nonplussed.

"I have often seen a businessman on a panel smile incredulously or a little contemptuously at the arguments advanced by one of his earnest adversaries. He knows—and he is right—that the argument is contrary to fact and ridiculous when held up to rigid, logical analysis.

"But the same man is all the more chagrined and uncomfortable when he finds the audience apparently accepting his opponent's colorful half-truths."

The Buffalo professor practices what he preaches because he is a leader of the first Economic Discussion Group organized by the Buffalo Chamber of Commerce. He has outlined the following ways in which a discussion group can be helpful to businessmen who are trying to expose the fallacy of socialism:

(1) It causes a representative group of business executives to re-examine the concepts and principles on which their lives and success are built. Too often they find these principles have become platitudes.

The intellectual stimulation that comes from examining, analyzing, and debating basic economic concepts in the discussion group process revitalizes the principles and re-establishes them as dynamic concepts of our economic system.

(2) Members become familiar with techniques used to discredit the system. They learn to recognize double talk, sophism, and other verbal gyrations so frequently used in critical attacks on private competitive enterprise.

(3) The discussion meetings tend to alert members to the ideological warfare that exists constantly as a threat to the fine system of which they are a part.

The discussions spark the realization that some arguments of socialists and others against the individual free enterprise — although flimsy in logic — may nevertheless have great emotional appeal if presented vigorously and often—unless they are mercilessly exposed at every opportunity by well-informed business leaders.

It might be a good thing for American business if more colleges had established professorships in "American Enterprise" and if there were more professors like Dr. Murphy in American colleges.

More About Pay TV

A recent statement in this department about subscription television has brought several inquiries from telephone industry people who want to know more about how telephone companies can fit into this newly developing TV picture. One reader of this department in particular was puzzled why Zenith Radio Corp., of Chicago, is so concerned about telephone companies getting in on the deal.

The answer, of course, is that there are two general classes of subscription television operations. One is closed-circuit television which goes into the subscriber's home, presumably via telephone wire. The other is a broadcast system which comes over the air via an antenna just like regular TV. Because of that fact, the broadcast system comes under the FCC regulation of radio channels.

A closed-circuit television operation can be intrastate and, if it uses no radio frequencies, does not even have to clear with the FCC. Zenith Radio Corp. wants to use a broadcast system. It is naturally concerned over the fact that closed-circuit television promoters have been going right ahead with their plans without any interference from the FCC.

The broadcasters, in other words, are probably afraid that the closed-circuit operators will get such a head start that subscription television via telephone wires will be an accomplished fact before the broadcast operators get away from the FCC post.

Last month the Los Angeles city council voted (11 to 2) approval of a franchise application of Skiatron TV, Inc., for a city-wide closed-circuit television system. As previously reported in this department, Skiatron is alleged to be linked with the Brooklyn Dodgers in an agreement to televise their games. This is evidently in anticipation that the "Bums" will move out of Brooklyn to Los Angeles as proposed. In addition to Skiatron there are other closed-circuit television outfits which will probably compete with Skiatron in bidding for the franchise.

Thus, closed-circuit television seems to be on its way. It is difficult to take an objective view of just where public interest lies—with so much rivalry and argument by interested parties. The radio-television promoters say that they have the best plan and speak menacingly of the "danger of telephone monopoly."

The closed-circuit people say their system will do a better job technically without the need for cluttering up the air waves with traffic that could just as easily move by wire. This, they say, will conserve the radio spectrum for other uses.

The regular television networks are indignant about the whole thing. They feel that subscription TV is going to cut their audiences for free television so that eventually they will have to cut their fees for advertising. They fear that the quality of free television will suffer in the long run.

Then, there is the question whether the public will pay for television. The answer probably is that it will if the entertainment is good enough. At pres-

(Please turn to page 58)

Tonics for Small Exchanges

By J. T. NAYLOR*

THE TOPIC assigned me does not lend itself to flag waving or self-adulation for our industry. It has to do with cold and practical problems —where we stand today and what to do about it. This discussion is about *small exchanges* generally and not necessarily about *small companies*. Let us grant the small company operator the privilege of talking for himself.

I should like to define the extent of the small exchange problem industry-wide. In approaching these questions, and for purposes which will evolve later, it may also be enlightening to think in terms of the scope of manual development throughout the country as contrasted to dial operation. There is a substantial correlation between manual development and the small exchanges throughout the industry.

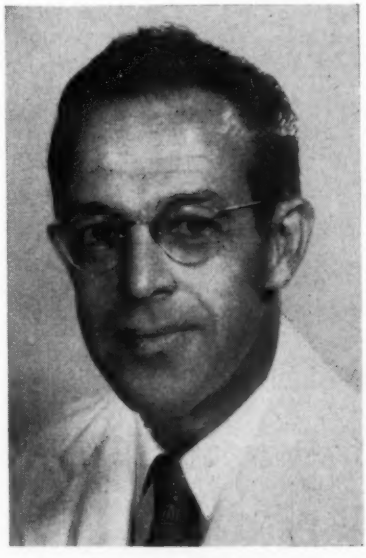
In the Independent segment of the business 85.7 per cent of some 4,800 exchanges reporting to the United States Independent Telephone Association have fewer than 1,000 stations; just short of 40 per cent of all Independent exchanges reporting were operating on a manual basis. The average size of the 1,925 Independent manual exchanges serving 1,765,797 telephones was 920 telephones per exchange. According to latest figures released by the Federal Communications Commission, the manual development in the Bell System at the end of 1955 totalled 6,161,989 telephones in 1,991 communities. The average station development in these communities was 3,100 stations. The over-all picture throughout the country displays 3,916 communities being served on a manual basis and having a total station development of 7,927,786.

Irrespective, therefore, of the technological strides and progress general statistics for the United States might show for telephone development, it is apparent that in terms of numbers of communities and telephones affected the problem of producing universal mechanized telephone service in this country is equivalent in size to the total telephone development in the United Kingdom and is double any of the nearest numerical rivals of Canada, Germany, France, or Japan. Small exchange and mechanization issues are common and universal to the entire business in this country.

General Problem Sources

As some of us see it, the small exchange issues stem from three principal roots which have become institutions in our society. The *first* of these has been the progressive development and maturity of the tradition and ideal of providing universal 24-hour service every place throughout the country, irrespective of the size and nature of the community involved. We have come to take this responsibility for granted; it is a ground rule by which we all perform without compromising with costs.

The *second* major influence in a three-pronged problem is that of the growing idea that wage levels and the cost of labor should be nationalized and, like the ideal of 24-hour telephone service, should be mounted on an arbitrary floor without regard for localized balance between costs of living or costs of other products and services. We must anticipate a universal wage floor by precedent if not actually by law.



J. T. NAYLOR

This ideological duet of 24-hour switchboard attendance and a universal wage floor harmonizes in a way which is defiant of normal economic laws. Nevertheless, they are shaping up to be the "rock and roll" of our business—all to the accompaniment of an eroding currency and escalating costs. These two influences fall in the operating sphere of our business.

The *third* influence falls in the financing sphere. It is perhaps not quite as absolute as the first two, embracing the broad question of acquiring financial resources to develop the small exchange. This factor is a complex issue of credit, desirable capital structures, cost of money, and ownership objectives in general.

Technical Programming

In the interest of both time and emphasis, I should like to take for granted, and leave for the observations of others, certain aspects of small exchange economy which are vitally important but can better be covered at other times. I have reference to the technical and engineering resources available, including mechanization of all varieties for both local and toll service.

Likewise, long-span facilities, subscriber line carrier and even radio techniques are high on the list of priorities for study in minimizing the annual charges of providing service. This searching out of superior engineering and technical solutions is an obvious and partial answer for every small exchange.

On this point, I should like simply to suggest that the long view and sound economy be sought out in the technical specifications for new and re-

*Mr. Naylor is president of the United Telephone Companies, Kansas City, Mo. He presented this address at the recent joint convention of the Washington and Oregon Independent telephone associations.

placement plant. Oftentimes, a low first-cost to "go dial" is an illusion leading to maximum grief and maximum costs later. Producing minimum annual operating costs over the long-pull is the only proper objective. This means more than simply mechanizing in the broad sense; it is a question of *how* we do it.

One misleading and careless statistical measurement that the industry has been prone to place much faith in of recent years is the percentage of dial development in a given company. This may or may not be a healthy indication. Many companies with high percentages of dial development may actually be in worse shape than those companies which still have the job to do. Terminal per line equipment and unorthodox numbering plans are often forerunners of uneconomic new investments, premature replacements, and a variety of expensive changes which produce no offsetting revenue increase inducements or economies.

It is much worse to have to re-do an expensive but improper job than to be starting from scratch and engineering the conversions properly and with foresight. Your suppliers and your own well-informed technical judgment and "know-how" are your sources of strength in this.

Exchange Revenues

Sources of adequate revenue for the small exchange and the healthy constitution of capital structures for small exchange development are just as important as the technical. To a great extent these are related. In discussing them, I should like to base my observations on the foundations summarized above. First that we must try to protect the ideal of 24-hour and universal telephone service, and second, that sooner or later, and probably sooner, the universal minimum wage will be here and here to stay. I assume that none of us wish to imitate the Post Office Department in its recent service curtailments; that would seem to be only a "last ditch" answer. The positive approach is recommended in facing up to these issues, rather than cutting corners.

On the "sources of revenue" question some of our remarks may seem trite but I believe there is a new emphasis required and that it is high time that the spotlight be cast on certain basic principles from which we have either been diverted or are too timid to explore. While rate levels can theoretically reach the point of diminishing returns, the very idea is weird in these times.

Public utility rate levels have been one of the few brakes on the inflationary spiral. So long as a family can buy a whole month of the stuff (utility service) for the cost of one tank of gasoline, or one good steak dinner, there need be no loss of sleep over the public interest. I would like to recommend comparison of value received for the prices paid and particularly price trends of the past ten years across the grocery or hardware or clothing counter as against telephone service in modest-sized communities.

Regulatory maturity is being reached in some locations and realism and service consciousness are displacing political preoccupation, and the tendency to measure regulatory talent on its ability to oppress public service. You are all probably familiar with some recent rate decisions rejecting outdated rule-of-thumb formulas and realistically fixing rates on the basis of actual financial needs to maintain and expand required services.

There have been other signs that there might be, under the influence of recent cost trends, a renaissance of regulatory thinking which will enable public utilities to take their proper place without a continual defensive struggle in the current economic environment of the country.

It does not take a financial expert or a doctor of philosophy to compute that if 50 per cent of a capital structure is debt at a reasonable going rate of 5 per cent, and the remaining 50 per cent is ownership at 10 per cent, to cover both the reasonable payout on investments and retained capital for growth, the earnings requirement is 7½ per cent. This is a minimum calculation where growth is involved as it does not recognize the *time lag* between securing capital and getting the resultant plant into productive service. As for the reasonableness of such figures, we need go no further than the record of major companies in their financing of the past year. Here in the Northwest, on a recent 12 million dollar bond issue for a public utility with as high credit rating as they come, the interest rate was 5⅜ per cent.

Research on a proper return for equity capital need be only as elaborate as cursory reading of experience data in the sale of new securities as reported in the trade press and newspapers. During March and April of this year, there were 13 substantial offerings of power and gas common shares. No notable telephone offerings were recorded for these months but, by and large, it is conclusive that power and gas investments usually run slightly more popular, and are priced at an average of one-half point better, than telephone on a price-to-earnings-ratio basis. Of the 13 separate offerings in March and April, the average earnings-to-price-ratio was 8.55 per cent, with a high of 11.49 per cent and a low of 6.99 per cent.

This reflects actual experience in the market, requires no theorizing or assumptions, has no margin for the idle capital interval nor liberality of any description. The cold circumstances, under which public utilities must undertake financial and service growth, emblazon the fact that a 7½ per cent rate of return in these days is slicing to the bone. Anyone who has the temerity of thinking in terms of 6 or even 6½ per cent—yes, or even 7 per cent—should have either his motives or his faculties placed under scrutiny. It is not necessary to go farther than the nearest newsstand to be that well informed.

Whether it requires education, persuasion, or litigation, all of these facilities, as needed, should be brought aggressively into full play in bringing rate levels up to the actual cost demands of the business. This, of course, means looking well to the internal operations, including the adequacy of management, supervisory, and employe wages in the brackets above the minimum. It is not fair to our public duty, nor to the investors in our business, to cut corners or engage in "shoestring" operations.

We are all more or less familiar with the clerical acrobatics which can be brought to bear to obscure the simple arithmetic in this question of a reasonable rate of earnings. One of the common ones, wearing long gray whiskers, is the clerkish view that the existing balance sheet and past history of a company establish the limitations within which rates should be fixed. It has also become pharisaical to contend that original cost, historical cost, fair value or what have you are the great anchorages of public interest. The patriarchs of rate science also seem once to have found a halo around the figure 6 per cent.

Today those premises, when applied, have the same credentials as advising a man with a broken leg to get out on the street and walk because he was well yesterday. It is today's economic scene and tomorrow in which our companies must live and serve. It isn't necessary to disregard a company's balance sheet and records as they stand to be realistic about the current problems of raising money and maintaining proper service levels under the actual financial, wage and commodity markets with which we are confronted. The American economy and the appetite for new and better grades of service are everything else except static. The

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corollary fuels and wherewithal of progress will not evolve from static and outmoded concepts.

To secure recognition of these circumstances is a tough job, indeed, in many locations, as our laws are variously constituted, used and abused. The problem is reminiscent of my first sophomoric day in a law class. The professor started out unsmilingly and in earnest with this remark: "Now get justice and logic out of your heads; we are here to study law written by lawyers and for the primary purpose of making work for lawyers. Anyone who tries to come up with answers based on simple right or wrong is dead sure to flunk this course."

My recommendation can only be that you bore in tenaciously for the rates you need. With perseverance and the proper facts, chances are that you can successfully wade through the swamps and jungles of specious mystery that lawyers, accountants, engineers, and political demagogues have built to obscure the simplicity and integrity of the multiplication tables.

"Performance Coverage"

In 1942 and 1943, a long-standing question on fundamental exchange and toll rate philosophy was resolved wherein the station-to-station principle displaced the old board-to-board ideas. This issue was a grass roots and fundamental one in our business. Although it seems obvious today that subscriber station plant and all exchange facilities must be credited as instrumentalities in providing toll service, most of us can remember the argument and strife which ensued just trying to prove this simple point.

I believe there is another equally fundamental principle still inadequately reflected in telephone revenue structures and which deserves aggressive and persevering action. I have reference to the principle of statewide revenue measurements as contrasted to the individual exchange approach.

It has been almost universally acknowledged that exchange-by-exchange rate fixing on a cost-of-service basis is unfair and discriminatory as between communities and mathematically next to impossible in the results that evolve. It likewise has certain impossible mechanics in that capital structures, financial costs, and many other aspects of a corporate or proprietorship composition cannot reliably be prorated to individual exchanges and toll lines.

Statewide rate fixing recognizes an averaging process wherein certain rates and services compensate for the cost of other services which are in themselves non-compensatory. To put it very bluntly, certain services subsidize others; certain exchanges subsidize other exchanges. I personally believe such practices to be perfectly all right and essential. It is an inherent part of making telephone service a universal convenience.

There is a conspiracy of facts, however, that presently renders this principle inoperative and which penalizes those companies which are preponderantly composed of small exchanges without facility for the subsidy inherent in companywide and statewide rate-making.

Drastic though this may sound, I believe it is incumbent upon the industry in general to find ways and means for the principle of statewide revenue resources to make up cost differences—call it subsidy if you will—for all small exchanges even across corporate lines. Let's use the term "performance coverage" to sweeten the subsidy feature, just as "area coverage" is a camouflage for a less justifiable subsidy.

We admit to a glib tendency in the industry to fasten convenient labels to the various operational and regulatory doctrines which are promulgated from time to time. We cover a lot of complicated and intricate problems with such terms as "fair value," "station-to-station," "Phoenix Plan," "Charleston Plan," "Area Coverage," and a host of other quick road markers. All of these expressions actually embrace great volumes of complex calculations and data and perhaps much discretionary judgment.

Likewise, the expression "performance coverage" which I have used for convenience extends to a multitude of considerations. I believe these considerations to be deserving of top priority in industry effort and for a moment I should like to be more specific.

A partial inventory of absolute performance standards and some of the problems which they pose are these:

(1) The same taxes and responsibilities to government which impact upon the big exchanges also carve into the small ones.

(2) They (small exchanges) are expected to be promptly available to give service at 2 a.m., just as in the big cities.

(3) Their rates are judged to a measurable extent by comparisons with rates of similar sized neighboring exchanges; no questions are asked about the degree to which such comparative rates may be subsidized or whether a neighboring exchange is in itself solvent or "losing its shirt." Large system rate grouping is becoming an influential yardstick.

(4) There probably is merit in the principle that the big city users and the toll users should pay a little extra on their telephone bills just to have all of the telephones in the country available to them at all hours of the day and night. It is probably exaggeration to call these extra increments a genuine subsidy, as the big city user does get some benefit through universal availability. But this principle fails for those of you who do not have the city user for an assist.

(5) Wage minimums discriminate against the small exchange; revenue levels in most of the Independent industry are out of joint with wage trends. The most recent 1956 year-end statistics show that in the Bell System, investment per employe was only 16 per cent higher than the Independents —$26,900 per employe as against $23,230—but gross revenue levels of Bell are 41 per cent higher per employe—$9,150 as against $6,482.

Perpetuating such disparity will not produce the uniform high grade service which the public demands and deserves, particularly in the thousands of small communities throughout the country. Granting that revenues to cover fixed charges and maintenance materials should be 16 per cent higher for Bell, the difference between 16 per cent and 41 per cent (the present revenue advantage) requires either improved Independent revenue levels or a stingy wage and manpower policy with its attendant inadequate handling of service responsibilities.

As stated before, proper exchange rate improvements may go a substantial part of the way and are the first order of business. To that extent each small exchange operator is "on his own" to go after the exchange income he needs. The toll business should carry its fair share as well and that may be an industry challenge with broad implications.

(6) Finally, I believe that no one in our business wishes to be responsible for paddling against the current of progress in living standards. There are no longer any "hick towns" in America. Radio, television, and highways have seen to that. Good, high-grade telephone service just no longer possesses an address; it belongs in every community we serve and it is up to us to make delivery.

I am sure that we all have the same purpose—to do a "bang up" service job. Until we find adequate ways and means of measuring and producing a uniformity of principle in providing the resources to do the job, however, we should be sensitive to a degree of failure.

Toll Revenues

In the preceding remarks I have given much credit to companywide and statewide revenue measurement as an aid to performance coverage, as far as it goes. This principle, simply stated, asserts that there should be no "soft spots" in a single company's armor and that those exchanges and services producing healthy results should to a reasonable extent carry and absorb those weak and non-profitable operations which may, nevertheless, be equally essential for public accommo-

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July 28, 1955

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dation. Such principles have not yet adequately infiltrated into the toll sphere of Independent operations, but they should.

The idea of separation cost studies is taking hold and is beginning to mature as a product of the station-to-station principles promulgated in Federal Communications Commission Dockets 6328 and 6468. Many of us believe that eventually such studies may be desirable and good in principle, but many of us also feel that to date neither the station-to-station principle nor separation study methods have been or can be properly applied.

Independent companies, by and large, have no voice in establishing toll rate levels, yet they are obliged to originate, terminate, and perhaps haul much toll traffic. To most of them, toll separation formulas are useless and academic. It can be said with finality and assurance that there is no one who can say today *what* we have to separate, or who can define this overexercised word, "costs." We have performed every calisthenic in the books in discussing costs, except the one thing that would be genuinely useful—providing a simple, clean-cut and universally acceptable definition of the word. That is not easy.

Everyone in the business squeals like a stuck pig when original or book costs are advocated, and properly so, because the concept is unrealistic and grossly discriminatory as between companies.

Fair value is a conglomerate of judgment factors and compromise on which no two people exactly agree.

Reproduction costs are a hypothetical mystery on which the wholesale construction and piecemeal growth proponents can argue interminably.

Prudent investment is nothing but a gilded label to disguise prejudices of some particular interest and to give dignity to hindsight and second guessing.

When costs are mentioned today, we are being as obscure as the subjects of religion or politics; as a conversation piece and working tool costs are just as wastefully inconclusive.

By comparison with more advanced industries, such as the country's railroad systems, we are as yet in the toddling stage in properly formulizing the division of toll revenues. Probably the small exchange and the small company have a greater proportional stake in this issue than any other segment of the telephone industry.

The experience of the railroads is enlightening in several respects. Their period of private negotiations on the division of interline revenues culminated in the assumption of jurisdiction by the Interstate Commerce Commission in the late 1930's. Delays, disagreements, and general wrangling between the roads exhausted patience to the point that they were relieved of their autonomy in setting up their own basis for divisions. This experience might well become prophetic for our industry. Further improvements in the art of transportation together with uniform performance coverage, stimulated by rather desperate competition, resulted in wiping out the arguments and mystery of cost disparities. A professional basis for interline divisions conceived in fundamentals rather than bickering was established.

Our industry can profit from this experience. In some respects, the communications business differs from railroading in emphasis as between terminal and line-haul functions; in many other respects railroading has its share of complications which are greater than ir communications. A fair recognition of competitive conditions is one classic example. The sum and substance of this comparison with a sister industry is simply that they are 20 to 25 years more advanced in their understandings and their relationships.

The proposals which I shall now venture might constitute a major stride toward narrowing this gap and in effect help us replace our present "prize ring" with a genuine conference table having professional dedication on all sides to public service and to mutuality of purpose in toll divisions.

If you will assume with me that some truly effective competition with telephone toll service were to develop, as did trucking and the airways to challenge the railroads, how long then do you believe our industry could continue its immature, hand-wringing bickering on revenue divisions? Self-protection would dictate the answer.

In this toll sphere of our business there does seem to be a reasonable answer to the challenge of performance coverage which not only displays equity and propriety in tune with our public responsibilities, but which will also function as a major shift from the present complications in setting up cost studies toward much greater simplicity.

The suggestion is this: That uniform average costs over the latest three to 5-year period for comparable wage and property units be applied on a statewide basis for all telephone plant and wage levels concerned in toll separation studies.

To those who would say that corporate lines must remain a barrier to uniform cost pricing, I should like to recommend that they consider that uniform service standards, uniform wage trends, uniform costs of equipment, and uniformly high grade public service do not respect corporate lines. Until the scene is rounded out by establishing a uniform cost formula, the industry has a vulnerable "blind spot" in its defenses.

We have heard the extremists shout for 30 years on their theories in the business — the dreamers with their Utopian equalization of costs under a "postage stamp" rate theory on the one hand, and the "dog-eat-dog" horse traders on the other. Sooner or later

(Please turn to page 53)

1957 Convention Calendar

Association	*Date*	*City*	*Hotel*
Alaska	Aug. 26, 27 and 28	Kodiak	Elks Club
Tennessee	Sept. 12 and 13	Nashville	Hermitage
Arkansas	Sept. 16 and 17	Hot Springs	Arlington
Michigan	Sept. 17, 18 and 19	Grand Rapids	Pantlind
Rocky Mountain	Sept. 18, 19 and 20	Salt Lake City, Utah	Utah
West Virginia	Sept. 30 and Oct. 1	Davis	Blackwater Lodge
North Carolina	Oct. 3 and 4	Pinehurst	Carolina
USITA (Annual convention)	Oct. 14, 15 and 16	Chicago	Conrad Hilton
Virginia	Oct. 24 and 25	Roanoke	Roanoke
South Carolina	Nov. 4 and 5	Clemson	Clemson House
Alabama-Mississippi*	Nov. 11 and 12	Birmingham	Thomas Jefferson
Georgia	Nov. 13 and 14	Albany	Radium Springs
Oklahoma	Nov. 21 and 22	Oklahoma City	Huckins
Florida	Dec. 2 and 3	Miami Beach	Balmoral

*Joint Conventions

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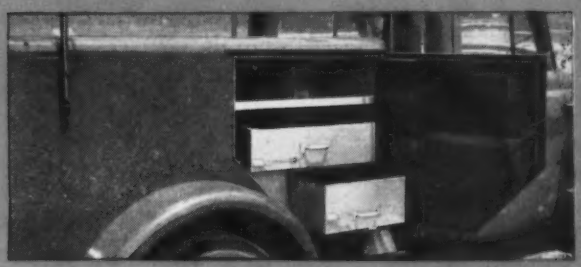

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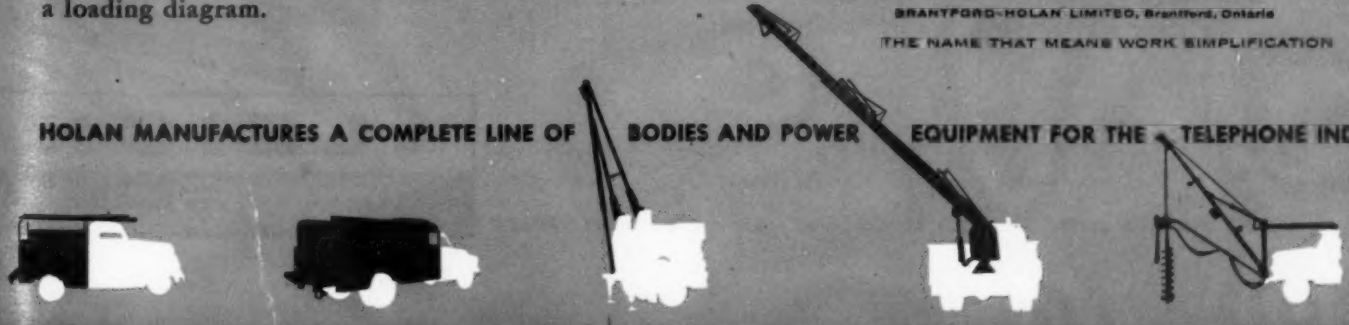
HOLAN CORPORATION OF GEORGIA, Griffin, Ga.
J. H. HOLAN CORP., Phoenix Div., Arizona
BRANTFORD-HOLAN LIMITED, Brantford, Ontario

THE NAME THAT MEANS WORK SIMPLIFICATION

HOLAN MANUFACTURES A COMPLETE LINE OF BODIES AND POWER EQUIPMENT FOR THE TELEPHONE INDUSTRY



SCENE 1
TAKE 3
SOUND 3

A story worth telling to your customers

Busy WREX-TV, CBS-ABC station in Rockford, Ill., needed a telephone system that could handle several types of calls with quick efficiency. Robert Mathews (right), manager of the General Telephone Co. in Belvidere, Ill., talked the problem over with WREX-TV's merchandising manager, Rollie Spongberg. This is what he found.

With a TV audience of over 1,000,000 the station switchboard was often a busy place. For example, there were plenty of incoming telephone calls when programs were occasionally interrupted by picture trouble, or when schedules were altered.

Quick intercommunication was important, too. When sudden program changes were made, engineers and others had to know right away.

And, of course, outgoing calls had to be made easily.

Mr. Mathews recommended the versatile Leich 40A PABX. On the opposite page are the reasons why—and the happy result.

If you'd like to tell your customers the story of Leich's 40A PABX, we'd be glad to send you our catalog. Write today.

LEICH

A MEMBER OF THE GENERAL TELEPHONE SYSTEM — ONE OF AMERICA'S GRE COMMUNICATIONS SYST

XUM

How **Leich's New 40A PABX** Gave Busy WREX-TV Exactly What It Needed....

versatile, fast communications

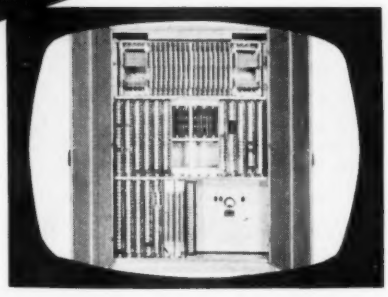
1. **Leich's Exclusive Keyset Turret.** When WREX-TV's attendant receives an incoming city trunk call, she can extend it quickly. She merely presses two keyset buttons in sequence. Callers are seldom, if ever, kept waiting by a busy attendant.

On consultation calls it isn't even necessary for the attendant to connect you. Just depress the telephone's hookswitch lever momentarily, then dial. You can hold a trunk call or transfer it without assistance from the operator.

2. **Standard Leich dial telephones** are used to give quick, easy service on both inside and outgoing calls.

One inside telephone can reach another inside party, like the TV engineer shown here, by dialing his two digit number. That's all.

Any inside station can call outside without waiting for the attendant. By simply dialing the digit 9, or 0, the inside party is connected to the main exchange. He can then dial, or give the number to the main exchange operator as the case might be.



3. **The Leich 40A PABX switchboard** is modeled after the famous Leich Dial System. It offers dependable, all-relay switching in a modern, compact cabinet. It can be installed in a room as small as 6 feet by 6 feet. All the power equipment is contained in the cabinet.

The switchboard has a capacity of up to 40 telephones with 10 trunks to the main exchange, and 6 local links. Local links are not tied up on extension dialed calls to city trunks.

4. **The result:** Joe Baisch, General Manager of WREX-TV, says: "Our TV station has a close, personal contact with our viewing public, our advertisers, our networks, and agencies. Things happen FAST in television and we need telephone communication that offers us the utmost in efficiency and flexibility. We're very pleased with the service furnished by the Leich PABX switchboard."

LEICH SALES CORPORATION, 427 WEST RANDOLPH STREET, CHICAGO 6, ILLINOIS

PACIFIC COAST: 11401 WEST PICO BLVD., LOS ANGELES 64, CALIFORNIA SOUTHWEST: 1227 SLOCUM STREET, DALLAS 7, TEXAS

manufacturers of telephones, switchboards and related apparatus since 1907

"Independent Telephone Week"

Ideal Time for Independents to Publicize • Advertise • Merchandise

*By LEON F. ROBERTS**

THE WEEK beginning Sunday, Sept. 8, has been proclaimed *Independent Telephone Week*. It will be observed nationally in recognition of the Independent industry's proud record of service, growth, and progress.

Keynoting this 60th anniversary celebration, there will appear in the September issues of *Time*, *U.S. News & World Report*, and *Farm Journal* a special advertisement which will be read by more than 6.5 million readers (see cover). Publication of the advertisement in these nationally circulated magazines offers every Independent telephone company in the land a grand opportunity to "tie in" locally and to publicize its own activities.

As a public relations, advertising, and merchandising vehicle, *Independent Telephone Week* should not be overlooked. In addition to publicizing and advertising your company and the industry of which you are a part through the media of your area newspapers and bill inserts, *Independent Telephone Week* presents a splendid opportunity for a variety of other activities. Here are some ideas which you might employ to get the most for your company from the national program.

Plan for an open house during that Week, ask your service personnel to talk about the Week when they make calls, encourage your office force to set up an *Independent Telephone Week* display, make up special paper badges to wear during the Week, and get yourself, or a competent representative, out to talk before the service clubs, lodges, and other civic groups in your area to more effectively tell the Independent telephone story. In short, use every means at your disposal to make your participation successful. It will mean more business and increased prestige for you and your telephone company.

The United States Independent Telephone Association has done, and will continue to do, everything it can to make things easy for you. To begin with, President Donald C. Power has issued an appropriate proclamation, embellished with fine printing, to which our Washington office gave wide distribution (TELEPHONY, May 4, page 19). Then, with the assistance of state association secretaries, USITA Executive Vice President Clyde S. Bailey prevailed upon the governors of several states to issue similar proclamations.

A press release for local use shortly will be sent to all USITA member companies. It will tell the story of Independent telephony, emphasize the significance of *Independent Telephone Week* and USITA's 60th anniversary, and will be written so as to allow you to add anything you want to concerning your company and its growth. Through the joint cooperation of both USITA local and national advertising committees, the Telephone Advertising Institute of Chicago, and the J. M. Mathes advertising agency of New York City, we are offering special advertising material without cost.

L. F. ROBERTS

Each member company has been mailed an attractive blue folder labelled "Free Tie-In Advertising From USITA." Each contains newspaper mats and a specimen bill stuffer. There are two mats for each advertisement to be published in national magazines during August and September: One 2 col. by 8 inch mat and one 2 col. by 5 inch mat (see cut for reproduction of tie-in mat). You need only to turn mats over to your local newspapers and request that your company's name be set in type at the foot of each ad. The newspapers will do the rest.

If you require additional mats, all you have to do is ask for them. All the mats and bill stuffers you need are absolutely free. Full instructions on how to order will be found on an inside page of the blue folder. All orders are handled by and should be addressed to Telephone Advertising Institute, 205 N. La Salle St., Chicago 1, Ill. (Telephone: CEntral 6-0870).

Tie-in advertising is a method of proved effectiveness used regularly by hundreds of successful advertisers. Here's *how* and *why* it works:

(1) You add thousands of readers to the national magazine circulation of vital industry messages.

(2) You concentrate these messages in *your* communities—over *your* company's name.

(3) To the large number of people in your area who see *both* the national and local advertisements, tie-in advertising means *double* impact—provides

*Mr. Roberts is Director of Information of the United States Independent Telephone Association.

direct association of your company with advertisements in leading national magazines.

And, all the material you need for gaining this valuable recognition for your company and your industry is *entirely free.*

Remember—when you tie in, you get *more* from your national advertising.

Open Houses

Now, more about the suggestion that Independent companies hold open houses during *Independent Telephone Week.* Many companies have found by experience and observation that there is no better way to improve and cement their relations with the public than by inviting them to come in, look them over, and see what makes a telephone office tick. A carefully planned, well-staged open house, widely publicized in advance, can do you more good in your community than any other gimmick we know.

There are many things you can do to make your open house a success. In this particular case, we suggest you'll profit by keynoting *Independent Telephone Week,* letting your subscribers know that you are a part of a great and growing industry, and that you are a good and valued member of the national trade organization of the Independent segment of the telephone industry—the United States Independent Telephone Association — which proclaims to the world through regularly published advertisements in the national magazines that America's 4,400 Independent telephone companies are an important part of the world's greatest and best telephonic communications system.

Your activities might include, as a preliminary to your party for the public, a family night, when you invite your employes and their families in for a bit of fun, friendship, and fraternizing. "Family Night" can serve as a dress rehearsal for "Open House Night" at which time you can intrigue your customers by taking them through guided tours of your offices and plant, showing them what happens when they dial, or when they have given the operator the number.

Don't forget the feminine touch. Let your service representative and switchboard operators know in time so that they can get a new hair-do, doll up in a fetching dress, and adorn themselves with other female fripperies.

Between or after tours, offer your guests a limited number of free long distance calls. (But make sure some joker doesn't try to call Nikita Sergeevich Khrushchev in Moscow. It's been done, you know.)

People always are intrigued by the sound of their own voices. Have a voice-recording machine available if you like, and let the customers hear playbacks of their voices. If you have colored telephones available, have an attractive display of them in an appropriate place. Serve coffee and doughnuts, if you like, and, if your rate structure is adequate, give the ladies a carnation—if not carnations, some other souvenir, such as a copy of "An American Story," USITA's handbook containing the facts about and the romantic history of the Independent telephone industry.

(Please turn to page 54)

Long distance
Our lines reach all the way back to 1897 . . . when early Independent telephone companies formed a national association to share ideas and experience . . . to keep pace with a fast changing America. Today, 4,400 Independents own a $2.5 billion stake in America's future—serve more than nine million telephones throughout two-thirds of the entire area of our nation.
September 8-14 is Independent Telephone Week in 11,000 U. S. communities.
60 years of Independent Telephony 1897-1957
INDEPENDENT
One of America's 4,400 Independent Telephone Companies
COMPANY IMPRINT

Promotional folder sent to USITA member companies contained two mats of the above newspaper ad to be used during Independent Telephone Week, Sept. 8-14. The ad ties in with USITA national ad to be run in September issues of *Time, U. S. News & World Report,* and *Farm Journal.* All companies are urged to run ad in their local newspapers.

Industry Sees Need to Set Up

• Telephone Technology Courses
• Own Employe Training Schools

By RAY BLAIN

THE SHORTAGE of engineers and trained technicians required to meet the needs of our complex and rapidly expanding communications industry is at last fully recognized. Moreover, it is the consensus that our present technical schools are unable to meet this demand under the conventional system of education.

The communications industry has, therefore, been forced to initiate action to provide this special training for its personnel. A few of these actions recently placed in operation will be discussed briefly in this article in an effort to indicate the necessity for this special training which it is believed should have the support of the Independent telephone industry.

The shortage of engineers and technicians is not necessarily a current problem as it was quite apparent back in 1954, and before when R. C. Reno, vice president and editor of TELEPHONY suggested that the industry and educational institutions cooperate in sponsoring telephone courses of instruction. The following is quoted from various speeches made by Mr. Reno at state telephone association meetings back in 1954.

"For several years we at TELEPHONY have been seriously concerned over the failure of our industry to attract young men. Several months before the close of World War II, we suggested that the Independent industry endeavor to attract Signal Corps men when they left the service.

"We urged that an attractive brochure be prepared for distribution to Signal Corps personnel, telling them the story of Independent telephony and inviting them to join its ranks.

"The Chief Signal Officer at that time offered his cooperation in distributing the brochures to Signal Corps personnel. However, nothing was done along this line.

"Today, such a move could still be considered as a means of attracting Signal Corps men who are being discharged from service.

Need "New Blood"

"Now, we might as well face the old law of nature, under which no unit of our social or economic fabric can survive without an infiltration of new blood. It will fail and die or become absorbed by other groups which have kept virile through the influx of new and young blood.

"This axiom certainly applies to individual telephone companies and to the Independent industry itself. If it is desirable to maintain the organization and strength of the Independent segment of our industry as one made up of thousands of strong private operating companies, then I believe we should be seriously concerned over the failure of the Independent industry, generally, to attract its share of young men coming out of high schools and colleges.

"Another basic need of the Independent industry—which, in turn, has a bearing on its ability to attract young men—is the establishment of straight telephone engineering and plant instruction courses, perhaps in several key universities, colleges, technological institutes or trade schools, with at least one located in each major section of the country.

RAY BLAIN

"To be sure, some schools have a smattering of telephone instruction in their electrical engineering courses, but it is not sufficient or practical enough to encourage young men to select telephony as their life work or to give them enough working knowledge of our business.

"These telephone engineering courses, which could cover both inside and outside plant, would not have to be formal courses, but could be informal, practical and of short duration, which could be taken by high school students who have a "hankering" to come into our business, as well as regularly enrolled students in the schools.

Subsidize Courses

"Of course, the industry might be called upon to furnish equipment and supplies for laboratories or workshops and teaching personnel for such courses, which would mean the schools would have the full paid-in tuition, without any investment or cost for teaching aids and instructors. There should be plenty of retired Independent and Bell men who could be interested in such positions.

"It may well be that the industry would have to partly subsidize such courses, but it might well be worth the cost. Even if some schools can be encouraged to include such courses, I think the Independent industry might also set up some courses of its own.

"There is hardly a month goes by that we do not receive letters from young men, asking us to direct them to a straight course in telephone engineering. As far as we know, there isn't such a thing, which, in my opinion, is a handicap to our industry.

"I think this matter of promoting and establishing instruction in telephony could, and should, be given serious consideration by our industry as a means of directing young men into, and preparing them for telephone careers."

It is now obvious that many of the needs cited by Mr. Reno several years

EAST or WEST... you get prompt delivery with

CF&I GALVANIZED STEEL STRAND

Need top-quality three- or seven-wire galvanized steel strand for guy, messenger, or overhead ground wire? Then, no matter what part of America you're in, one of our two modern plants—at Pueblo, Colorado or Buffalo, N. Y.—will quickly and efficiently fill your strand requirements.

What's more, in addition to prompt delivery, you're always sure of the quality of CF&I Galvanized Steel Strand. Every phase of its production is under the CF&I rigid quality control system . . . every phase of its production is supervised by the manufacturers of world-renowned Wickwire Wire Rope and Wire Rope Slings.

When you need strand—to your own or ASTM Specifications A-122 or A-363—it'll pay you to contact your nearby CF&I sales office.

GALVANIZED STEEL STRAND

THE COLORADO FUEL AND IRON CORPORATION

4473

Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Kansas City Lincoln (Neb.) • Los Angeles • New Orleans • New York • Oakland • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City San Francisco • Seattle • Spokane • Wichita • CF&I OFFICES IN CANADA: Toronto • Montreal

ago are finally being recognized. The following indicates action now being initiated to attract young men to our industry and train them for a useful career in communications.

WE, Schools Cooperate

The Western Electric Co., in cooperation with a number of leading universities, has launched a program of graduate education for its engineers. The cost of this instruction is borne entirely by the company. The new program is equivalent in cost and administrative effort to the establishment of a new engineering school of 1,000 full-time students.

This educational activity is being conducted on college campuses and in three specially equipped centers in New York, Chicago, and Winston-Salem. Each of these centers will include laboratories, study halls, classrooms and related facilities. When in full operation, the program will involve a staff of some 65 full-time Western Electric instructors and administrative people, and about an equal number of instructors recruited on a part-time basis from the faculties of cooperative universities. About 2,000 students per year will engage for periods of time in full-time off-the-job study.

Presently, six universities are cooperating in the program: New York University, Northwestern, Illinois Institute of Technology, Cornell, Duke, and North Carolina State. It is anticipated that the list of cooperative institutions will be extended as the program develops.

After from four to six months on a full-time engineering assignment, groups of newly employed engineers will attend a series of courses over a period of nine weeks on various communication subjects.

Subsequently, they and other engineers will be eligible for the advanced development phase, participation in such work being dependent upon individual qualifications, needs and capabilities, without regard to age or length of service with the company. This phase of the program will consist of a series of courses offered singly or in pairs, each of which will involve approximately 80 hours of study.

These courses will provide intensive training in subjects such as operations, research, industrial control devices, engineering statistics, planning of manufacturing facilities, computer theory, advanced tool design, and others, as the needs of the business may require.

Faces Big Change

Western Electric contends that while a shortage of engineers and scientists now exists, and undoubtedly will for a long time continue to exist in this country, graduate training designed specifically for its engineering body can ease this critical problem by making young engineers more quickly effective and by increasing the capabilities of experienced engineers.

The company, like many others today, realizes that it faces the greatest pace of technological change it has ever known. Much of this change involves new art and science not taught formerly in engineering schools or which has not been easy for engineers to acquire subsequent to graduation.

While it is true that universities offer fine graduate courses, and Western Electric will continue to look to these for help in the education of engineers, many courses, however, of high interest to a particular company or industry are specialized to the extent that academic institutions would not be justified in offering them for general enrollment.

In addition, although the Western Electric's tuition refund plan facilitates attendance in graduate courses at the universities, the engineer who is well launched on his career may face difficulties due to family problems and factors such as travel and working hours.

Like all major educational efforts, this program is of necessity evolutionary in character. It is certain to change as experience is acquired. Participation by university instructors in the program and observation and advice by faculty officials will help not only to perfect this effort but also indicate the best manner in which universities and industries such as ours can share the problem.

Western Electric realizes that the basis of professional development is self-development which must largely be acquired in informal and unorganized ways. But it believes, also, that the new Graduate Engineering Training Program will both stimulate this self-development, and also render it more feasible, by supplying additional groundwork on which the individual engineer may build.

There are, in the opinion of Western Electric, absolutely no limits to the creativeness and effectiveness of its engineering body, given adequate technical knowledge and strong motivation. Some of the former, the company can supply. The latter, it hopes to stimulate.

The Rural Electrification Administration is becoming quite concerned over the present shortage of engineers as was pointed out by J. K. O'Shaughnessy, assistant administrator, in a recent letter to REA telephone borrowers, consulting engineers, contractors, and telephone associations. This letter cites the fact that a number of schools of the technical institute type have been offering specialized courses designed to train personnel for utilization by industry in various semi-professional engineering positions.

A similar requirement exists in the telephone industry—for personnel with specialized training to take over many of the semi-professional jobs now being performed by the engineer.

Schools Interested

Several schools of this type have recently expressed an interest in instituting courses in telephone technology designed to provide two years of college level engineering technical training specifically in the field of telephony.

Graduates of these courses would have general training in mathematics, electrical and electronic theory, drafting, and in the physical sciences, as well as specialized training in instrumentation and test equipment, telephone transmission, automatic switching equipment, toll equipment, carrier and microwave equipment, traffic measurements, etc. Graduates in these courses would receive the degree of Associate in Science in Telephone Technology.

At the present time, engineering technicians serve industry, including some segments of the telephone industry, as engineering assistants and aides, inspectors, estimators, technical training instructors, and in many positions in the field of construction, installation, operation and maintenance of specialized equipment.

Their training in the fundamental sciences, plus training in the application of these fundamental principles in industry, serve to relieve the engineer

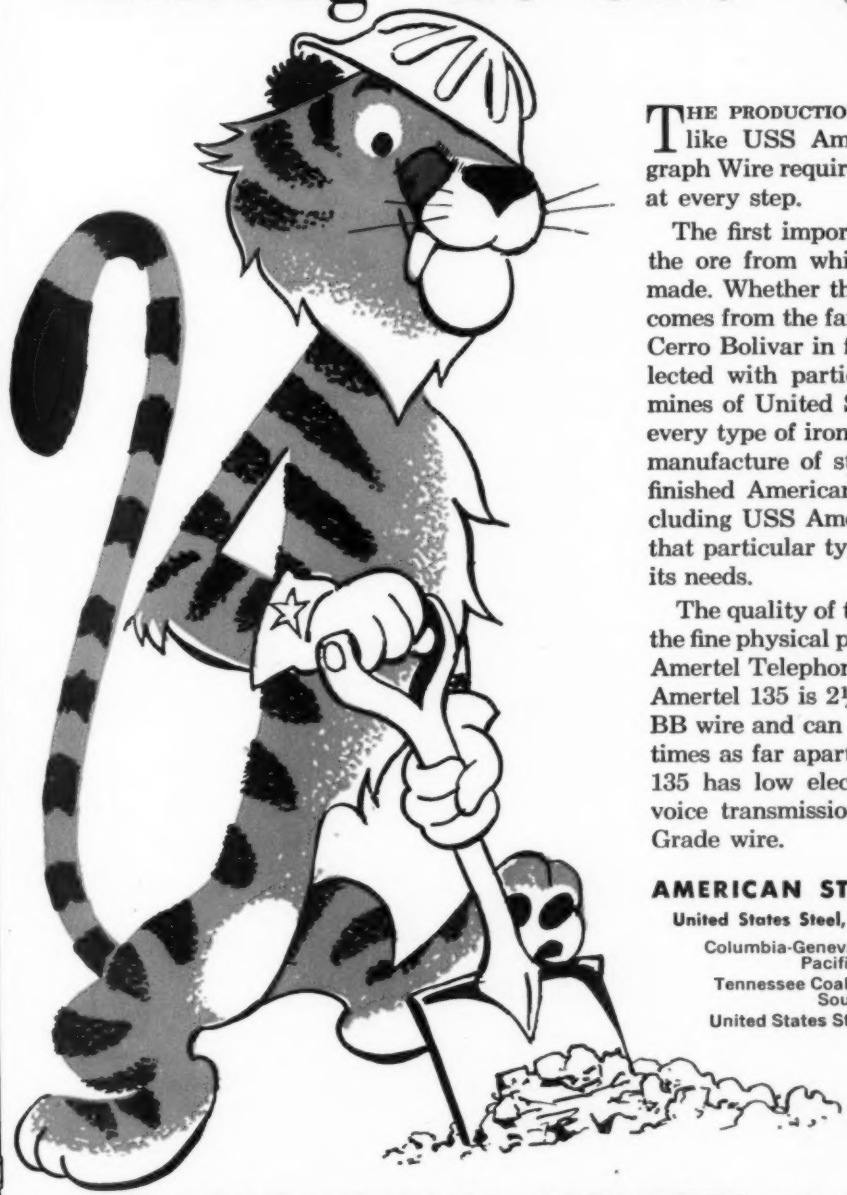
(Please turn to page 50)

XUM

THE MAKING OF USS AMERTEL TELEPHONE WIRE

A story of Quality in four parts

PART I:
Mining the Ore



THE PRODUCTION of a fine quality product like USS Amertel Telephone and Telegraph Wire requires special care and attention at every step.

The first important step is the selection of the ore from which high-grade wire will be made. Whether the iron ore for USS Amertel comes from the famous Mesabi Range or from Cerro Bolivar in far-away Venezuela, it is selected with particular care. In the iron ore mines of United States Steel is found almost every type of iron ore used in the present-day manufacture of steel. This means that every finished American Steel & Wire product—including USS Amertel—can be produced from that particular type of steel which best meets its needs.

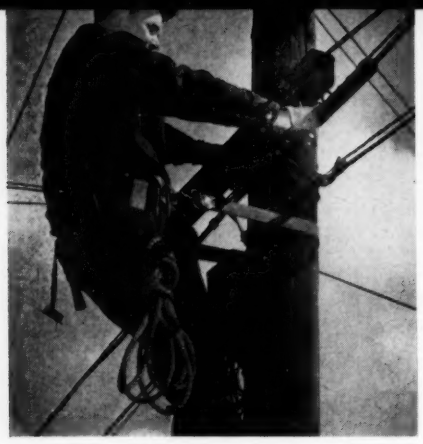
The quality of the steel has much to do with the fine physical properties of the finished USS Amertel Telephone and Telegraph Wire. USS Amertel 135 is 2½ times as strong as regular BB wire and can be strung with poles set 2½ times as far apart. In addition, USS Amertel 135 has low electrical resistance and better voice transmission characteristics than Steel Grade wire.

AMERICAN STEEL & WIRE DIVISION
United States Steel, General Offices: Cleveland, Ohio
Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, New York

USS

USS TIGER BRAND AMERTEL *Telephone & Telegraph Wire*

UNITED STATES STEEL



THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

IT IS NOTED with considerable interest that the Bell System is presently installing its first all-numeral-dialing telephone exchange at Wichita Falls, Tex. This exchange of the Southwestern Bell Telephone Co. is scheduled to be cut into service during January 1958.

It is our often-voiced contention that this arrangement will materially reduce wrong number calls. A recent article in the *Southern Bell News* states that there are some 700,000 people in the South who dial the wrong number every day.

According to the Bell System's figures, if you make only one mistake in dialing every hundred calls you are doing pretty well. Many—perhaps the average dialer—make more errors, and perhaps one wrong number in 30 calls may be considered about average.

An average of over 220 million telephone calls are made in the United States daily. If even one out of each 100 is a wrong number call, this represents a terrific loss and service detriment.

It is also understood that the holding time on direct distance dialed calls has not been reduced as much as had been expected from this improved grade of service. That the holding time has not been reduced as much as had been expected is blamed on the excessive volume of wrong number calls being made by dialing customers.

There is no doubt that the letter-number dial is responsible for many of these wrong numbers.

There is constant confusion between the "zero" and the "O," the "I" and the "1".

Watch the average dialer making a call and note the hesitation while selecting the correct letter from the three that appear on each numeral of the dial. Then watch how free and easy he completes the dialing after the letters have been taken care of. The selection of each numeral of the 10 that appear on the dial comes naturally and without the slightest confusion or hesitation. In addition, when the letters are omitted, the numerals can be made larger on the dial, and this alone should materially help eliminate confusion.

We are familiar with — and frequently reminded of—the studies made several years ago which showed that an office name and four numerals were easy to remember and that five numerals and even six numerals could be remembered with a small percentage of failure.

Furthermore, failures and errors increased when the attempt was made to remember seven numerals. The seventh numeral seemed to be the one that caused the trouble. We wonder if a similar test made today, after the average individual has had many years' experience in dialing numbers, might not produce startlingly different results.

Personally, we prefer 623-4567 to MA 3-4567. Then, too, with direct distance dialing, will it be possible for the average telephone user who can remember and dial MA 3-4567, to also remember and dial 312 MA 3-4567? In other words, how will he make out when he must dial two letters and eight numerals?

Some operating companies encourage their customers to write down numbers before they dial them. They claim, and we believe rightfully so, that writing it down makes correct dialing much easier.

Perhaps, also, a calling device such as the Dial-A-Phone, a small machine installed alongside the telephone that will dial up to 350 numbers, by merely pushing a button, will provide at least a partial answer to the problem. It is noted that this device was recently authorized by the Public Utilities Commission of California for use in that state.

Back in the old days when dial service first made its appearance in the Bell System, it was obvious that it would be necessary to maintain manual as well as dial offices in many areas for a considerable length of time. It was then decided that if the then well-established advantages of office names in manual operation were to be retained, each office must have a name as well as a number.

This, we believe, is the principal reason that we today have our letter-number dial. It is actually a carry over from the old manual days. It serves no useful purpose, but is actually a detriment to our present-day telephone service.

Formerly, in many large cities, the first three letters of the office name were dialed. When telephone traffic increased, and it was necessary to provide a greater number of central offices, it was found extremely difficult to select office names so that the first three letters could be arranged to furnish distinctive office codes.

It was then decided to designate each office by the first two letters of the name and one numeral instead of three letters. This provided a greater flexibility in selecting names and had the additional advantage of permitting two or more offices in the same area to carry the same name, but a different number. This was when the 2L-5N system came into being.

That the exchange name in a telephone number today is obsolete is evidenced by the fact that very few make use of it any more. Notice the ads in your daily papers and you will find that most of the telephone numbers indicate the letters and the numerals and omit the exchange name.

Even toll operators, it is noted in many cases, make use of the letters only. Recently, we made a call to PAwtucket 6-6300 in Ashton, Rhode Island, and the operator inquired if we wanted PA 6-6300.

Then, too, an exchange name, such

(Please turn to page 38)

XUM

New bulletin to give you

THE FACTS ON NEW COPPERPLY® WIRE

Bulletin 202 contains helpful engineering data and general information on the features, characteristics and use-advantages of unique Copperply wire.

And Copperply *is* unique with its electroplated copper coating, precise concentricity, and weld-free lengths. It is available in a broad range of sizes, coating weights and steel core analyses . . . and on reels up to 600 pounds for insulating, or in standard coils for field construction.

So write National-Standard, Niles, Michigan for your copy of Bulletin 202. It gives the facts you should have at hand.

NATIONAL NS **STANDARD**

DIVISIONS: NATIONAL - STANDARD, Niles, Mich.; *tire wire, stainless, music spring and plated wires* • **WORCESTER WIRE WORKS, Worcester, Mass.;** *high and low carbon specialty wires* • **WAGNER LITHO MACHINERY, Secaucus, N. J.;** *metal decorating equipment* • **ATHENIA STEEL, Clifton, N. J.;** *flat, high carbon spring steels* • **REYNOLDS WIRE, Dixon, Ill.;** *industrial wire cloth.*

MAIL COUPON TODAY!

National-Standard Company, Niles, Michigan:
Please send me a copy of Copperply Bulletin 202

Name_____

Title_____

Company_____

Address_____

DEPARTMENT OF TECHNOLOGY
BUFFALO AND ERIE COUNTY PUBLIC LIBRARY

900.00
FIRST NATIONAL
BANK
900.00

MEMO

to the man who enjoys dividends

Sir — Strowger Automatic was made for you! It was designed to favor the factor that keeps those dividend checks rolling in — net earnings. Let's look at the facts:

Strowger Automatic Handles Expansion Easily

Merely jacking-in a new switch provides moderate growth. Pre-wired shelves (ready to slip into place) and complete, pre-wired frames take care of further growth. You'll never find yourself "boxed in." And Strowger expansion is so simple that it's surprisingly low in cost. You save money, you keep your net earnings up — and you keep up dividends!

Strowger Automatic Means Economical Conversion to DDD

Direct Distance Dialing, "2-5" numbering, automatic toll ticketing, expansion to Director operation — whatever the new service requirement, your Strowger Automatic exchange will meet it economically. It's simple, straightforward equipment that's easy to adapt as needed. So it's a dependable investment over the long term; net earnings stay up — and so do dividends!

Strowger Automatic Insures Low-Cost Maintenance

Constant research, careful quality control, precision manufacture, make Strowger Automatic a jewel of smooth-running dependability. Maintenance time is low, indeed. Maintenance costs are correspondingly low, which means greater net earnings — and dividends!

For over 60 years Strowger Automatic has proved its ability to meet each new need, has helped bring prosperity to hundreds of telephone companies. Insure this prosperity for yourself and your stockholders — call Automatic today. We'll be pleased as punch to help you! Address: *Automatic Electric Sales Corporation, Northlake, Illinois. Or call FIllmore 5-7111.*

AUTOMATIC ELECTRIC

A member of the General Telephone System — One of America's great communications systems

GENERAL TELEPHONE SYSTEM

as Murray Hill, is always confusing as many will dial MH instead of MU. Exchange names of Mott Haven and Laurel Springs are equally confusing.

Fortunately, however, only a few of these two-word exchange names remain in service. Furthermore, if the letters and exchange names are dropped, telephone directories may be greatly simplified.

At the present time, due to space limitations, exchange names are so abbreviated in our telephone directories that often it proves extremely difficult to make out the first two letters and to decipher the exchange name is utterly impossible.

With the tremendous present-day increase in telephone service and the requirements for inward dialing to large PBX systems, the need for additional exchange codes is obvious. To find suitable names with initial letters corresponding to certain combinations such as 55, 57, 95 and 97, proves extremely difficult and in some cases impossible.

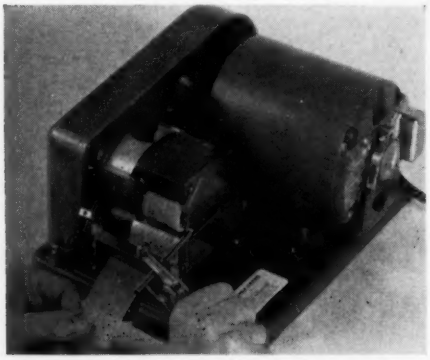
These codes are presently being reserved for radio-telephone use. If we drop the letters and exchange names, many of these codes may be utilized to advantage, as required, to meet our ever-rapidly-expanding telephone requirements.

It will be interesting to note the results of the Wichita Falls experiment. We will wager right now that the wrong number calls will be considerably less than when a letter-number dial is used.

It is quite obvious that the all-numeral dial will not select the correct number for the sloppy, careless dialer. It should, however, prove a great help to the average individual who makes an honest effort to dial properly. This in itself will be an improvement.

•

The introduction by Tape Cable Corp., Rochester, N. Y., of a flat, multiconductor, ribbon-like electrical cable, known as Tape Cable (trade mark), has opened up new concepts in the field of electrical design. The cable is a ribbon-like, flexible film in which are imbedded flat copper conductors only .0015-inch thick.



Stripping Tape Cable (trade mark).

The conductors are parallel, accurately positioned, and are surrounded by carefully controlled transparent polyester insulation. This results in a cable having minimum cross sectional area, minimum inter-conductor capacitance, high tear strength, high flex life, and high resistance to chemical attack.

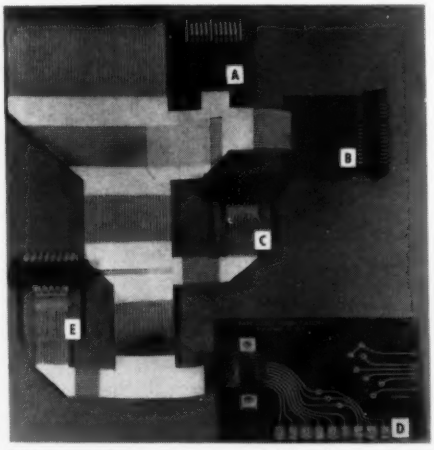
Conductors in standard Tape Cable have .100 inch center-to-center spacing in accordance with the recommended RETMA grid pattern for printed wiring. Nine standard sizes have been established having 9, 14, 17, 21, 27, 30, 36, 40 or 50 conductors.

The standard conductor is .0015 inch by .030 inch. This gives Tape Cable a high conductor density, 1160 conductors per cross-section square inch as compared with only 225 for ordinary cable having 22-gauge wire insulated with .010-inch wall.

Since the weight of Tape Cable is only a fraction of standard insulated cable, a 100-foot roll of 50-conductor weighs only 2½ pounds.

This is a saving of 85 per cent in copper over conventional cable having round conductors of the same current handling capacity and makes the new product especially applicable where weight and space are critical.

The most striking electrical characteristic of Tape Cable is its low inter-conductor capacitance. Since it is less than 5 mmf. per foot between conductors, Tape Cable is ideal for high frequency applications. Grounding alternate conductors will reduce the interconductor capacitance to under 1 mmf. per foot in free air.



Fifty-conductor Tape Cable harness. A: nine-contact Tape Cable plug with rubber sleeve, wedge strain relief and Cinch connector. B: 14-contact Tape Cable plug with rubber sleeve, wedge strain relief and Amphenol connector. C: nine-contact Elco plug and connector. D: nine-contact printed circuit board, with bar strain relief and Tinnerman nuts for making wire connections. E: nine-contact Elco plug and connector.

Because of the large heat-dissipating characteristics of flat conductors, each conductor in Tape Cable has a conservative rating in free air of one ampere. This is adequate for most signal circuit requirements.

It is interesting to note that a conservative rating of 300 volts is achieved with a maximum cable thickness of only .011 inch.

Since Tape Cable is so thin it has a phenomenally high flex life, many times that of conventional cable. It has been successfully used in applications requiring continuous flexing on a radius of ¼ inch.

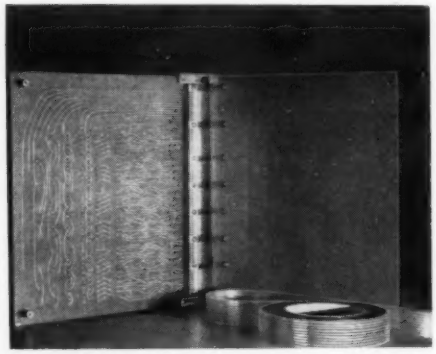
Tape Cable is lighter, easier and faster to handle, and requires less space than conventional type cables.

Since the insulation is of uniform thickness and the conductors are accurately positioned, the insulation may be removed from all of the conductors in one operation. Then all conductors as a unit may be aligned with a mating connector and dip-soldered simultaneously to complete the connection.

The mechanical strength of Tape Cable, as in the case of printed wiring, is in its insulation. Tests indicate a tensile strength of 80 pounds per inch of width.

To take full advantage of this high tensile strength, which is greater than that of soldered connections, a strain relief should be used in termination. Several varieties of strain reliefs have been designed by the manufacturer of Tape Cable.

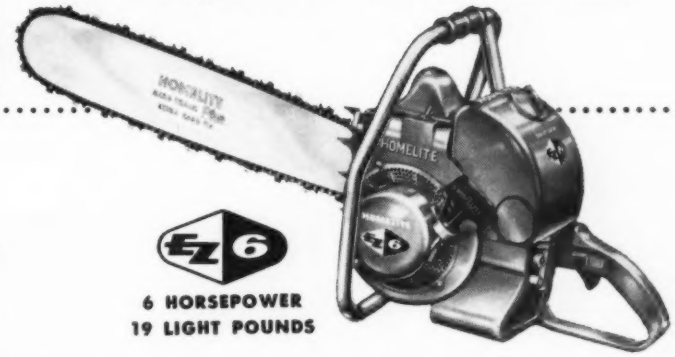
Tape Cable allows a number of conductors to be treated as a single wire. This reduces the assembly and maintenance costs of multiconductor installations. For example, all or any number of the conductors in a single cable may be stripped rapidly and easily in one



Tape Cable interconnects chassis "leaves" in book-type construction on government project by Stromberg-Carlson Co., a division of General Dynamics Corp.

Choose from Two NEW HOMELITE CHAIN SAWS...

the 6-Horsepower "Power Twins"



The Homelite EZ-6
DIRECT DRIVE CHAIN SAW

Fastest-cutting direct-drive chain saw made, the 6 horsepower of the EZ-6 makes quick work of trees up to 5 feet in diameter. Famous Floating Power and a light 19 pounds make the EZ-6 easiest of all to handle. Ideal for clearing building sites, repairing storm damage, maintaining rights-of-way.

EZ 6

6 HORSEPOWER
19 LIGHT POUNDS

The Homelite 6-22
GEAR DRIVE CHAIN SAW

Most versatile chain saw you can own, the 6-horsepower, 22-pound 6-22 does everything. Brings down big trees, up to 7 feet in diameter. Built to rugged professional standards, the smooth-operating 6-22 stands up under the grind . . . day in and day out. Money-saving attachments convert the 6-22 in seconds to plunge-cut bow, brush-cutter or clearing attachment. Does any woodcutting job for contractors, road builders, utilities, tree surgeons, park commissions.

6 22

6 HORSEPOWER
22 LIGHT POUNDS

WIN A FREE CHAIN SAW EVERY YEAR FOR LIFE... IT'S EASY!

Nothing to buy, nothing to write, no obligation. Just have a free demonstration of the new Homelite Power Twins. You may have three chances to win! GRAND PRIZE: a free Homelite chain saw every year for life, PLUS 25 chain saws given away by Homelite District Offices, PLUS hundreds of chain saws being awarded by Homelite dealers in their own local contests. Register now! Limited to residents of the United States and subject to local state, county and city laws

HOMELITE PORT CHESTER, NEW YORK
A DIVISION OF TEXTRON INC.
1808 RIVERDALE AVENUE, PORT CHESTER, NEW YORK
Homelite Builds and Sells More Chain Saws than any Other Company in the World
Manufacturers of Carryable Pumps • Generators • Blowers • Chain Saws

operation by a pair of opposing high-speed glass-fiber wheels. The stripped conductors of each cable may be handled as a unit and two or more cable ends brought together, dip-soldered and insulated with tape to form a splice.

Since Tape Cable is available in rolls of lengths up to 1000 feet, it is ready to use in a wide variety of designs, and is not limited to any specific lengths. This cable may be rapidly cut to length, either with scissors or an automatic tape dispenser.

There is little doubt that Tape Cable will be extensively used in applications where weight and space are critical, such as aircraft, missiles, portable and mobile equipment.

Its greatest use, however, is expected to be in telephone switching equipment and computers and other electronic equipment where multiple electrical interconnections must be made with a minimum of labor and expense. Tape Cable lends itself well to automation techniques.

Tape Cable Corp. has established sales representatives throughout the country. Complete technical information may be obtained from this company at 790 Linden Ave., Rochester 10, N. Y.

•

A little pint-sized instrument may soon replace the elaborate cable testing gear now in general use by many operating telephone companies. Yet unnamed, tester "X" is as real as the now-known transistor and, we have good reason to believe, it is equally revolutionary in the field of communications.

This new device can test a line, busy or idle, without interrupting service. Moreover, tester "X" eliminates the need of the head receiver now used in cable testing as it antiquates the need to "listen in" on a private telephone conversation in order to determine whether or not a line is in use. This little instrument does all of the listening and indicates instantly whether a line is busy or idle on a simple visual meter.

The tester is basically a 1,000-ohm-per-volt voltmeter with a scale 0 to 60, or a total resistance of 60,000 ohms. One side of this meter is grounded, and the other is connected to a regular transfer clip to which is also attached a three-way switch.

When a splicer is making a cable throw and testing is required, to avoid cutting off a busy line, the test clip is connected to one side of the line. If the line is not busy, the meter reads 48 volts, but if it is in use, the meter reads 24 volts.

P. M. BUHLER

If the visual signal indicates that the line is not busy, the switch is operated, connecting the tone to the pair.

Because of the high resistance of the meter — 60,000 ohms — it causes no trouble on the line. Other refinements and features are incorporated in the test set, it is said.

The inventor of tester "X" is Peter M. Buhler, veteran cable splicer of Southern California. As Mr. Buhler modestly expresses it: "My checkout system has always been in existence—all I did was put a few standard pieces together."

The discovery of tester "X" came to Pete Buhler like a vision of a forest to the man who backed away from the trees. "I guess all I really needed was a vacation," he recalls. "I was a long way from any tag board when the idea hit me."

To Mr. Buhler, the revelation was rather frightening; he was so astonished by the simplicity of his idea and by his assurance of its feasibility that he was certain a thousand cable splicers had beat him to it. "Even though I was delighted to learn that I had the right combination, I really had little hope of becoming the 'hero' who might introduce it," he says. But so far he has found not one predecessor to his unique system.

Tester "X" probably will be available the latter part of August. All Mr. Buhler needs is a bona fide trade name for his portable kit.

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The formula for success has been described as simply placing the right people in the right jobs, and then sitting back on the sidelines and being a good cheerleader.

•

The Department of Agriculture now reports that it has found more than 400 uses for electricity on the farm.

PLANT MAN'S QUIZ

Q. Is it true that the failure of a repeater or a terminal on a microwave system will place the entire system and all of its channels out of service? Also, is there any method by which continuous service over a microwave system may be assured?

A. It is true that a major equipment failure would place the system out of operation.

However, present-day equipment is so well designed and constructed that major failures are infrequently experienced.

Continuous service over a microwave system may be assured by the use of automatic switchover to standby equipment in the event of failure of the main equipment. Indications of this switchover may be transmitted over the microwave system to the designated maintenance office.

•

Q. When plowing in a cable to a depth of about 36 inches, with a suitable plow, what pulling power is required and at about what speed will the plow be able to travel in average soil conditions?

A. It is most important that the prime mover have ample reserve power to pull the plow at a steady rate. Ordinarily though, in average soil, the equivalent of one D8 Caterpillar tractor will prove adequate.

When out-of-the-ordinary conditions are encountered, a winch may be used to pull the plow.

The speed at which the plow travels will be governed by local conditions on each job, but ordinarily it should not exceed about 150 feet per minute.

•

Q. When horizontal drills are used to place telephone conduits under street, can the holes be bored with any degree of accuracy?

A. We are advised by one authority that when holes are drilled in homogeneous soil, the accuracy is generally within 6 inches when a hole is drilled for a distance of 40 to 50 feet. Even when rocks are encountered in a hole of this length, the deflection is generally not over 18 inches. In order to obtain this accuracy, however, the drill must be properly set and carefully aligned.

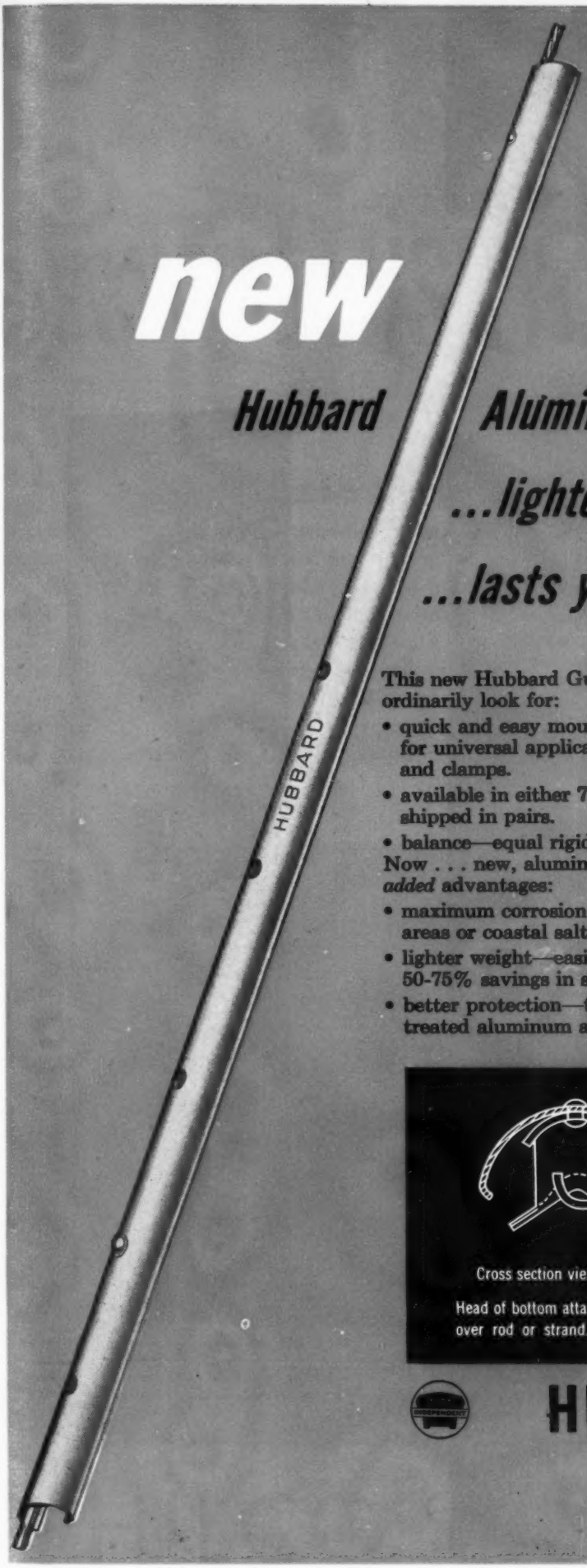
XUM

new

Hubbard Aluminum Alloy Guy Protector

...lighter, stronger!

...lasts years longer!



This new Hubbard Guy Protector has all the features you ordinarily look for:

- **quick and easy mounting—multiple attachment holes designed for universal application, at any height, to guy wires, rods and clamps.**
- **available in either 7 (Al-27) or 8 (Al-28) foot lengths, shipped in pairs.**
- **balance—equal rigidity and strength throughout.**

Now . . . new, aluminum alloy construction brings you these *added* advantages:

- **maximum corrosion resistance—even in heavy industrial areas or coastal salt air regions.**
- **lighter weight—easier stock handling and installation. 50-75% savings in shipping charges.**
- **better protection—turned lengthwise edges and new heat-treated aluminum alloy give maximum strength, durability.**

Cross section view of top clip

Cross section view of bottom attachment

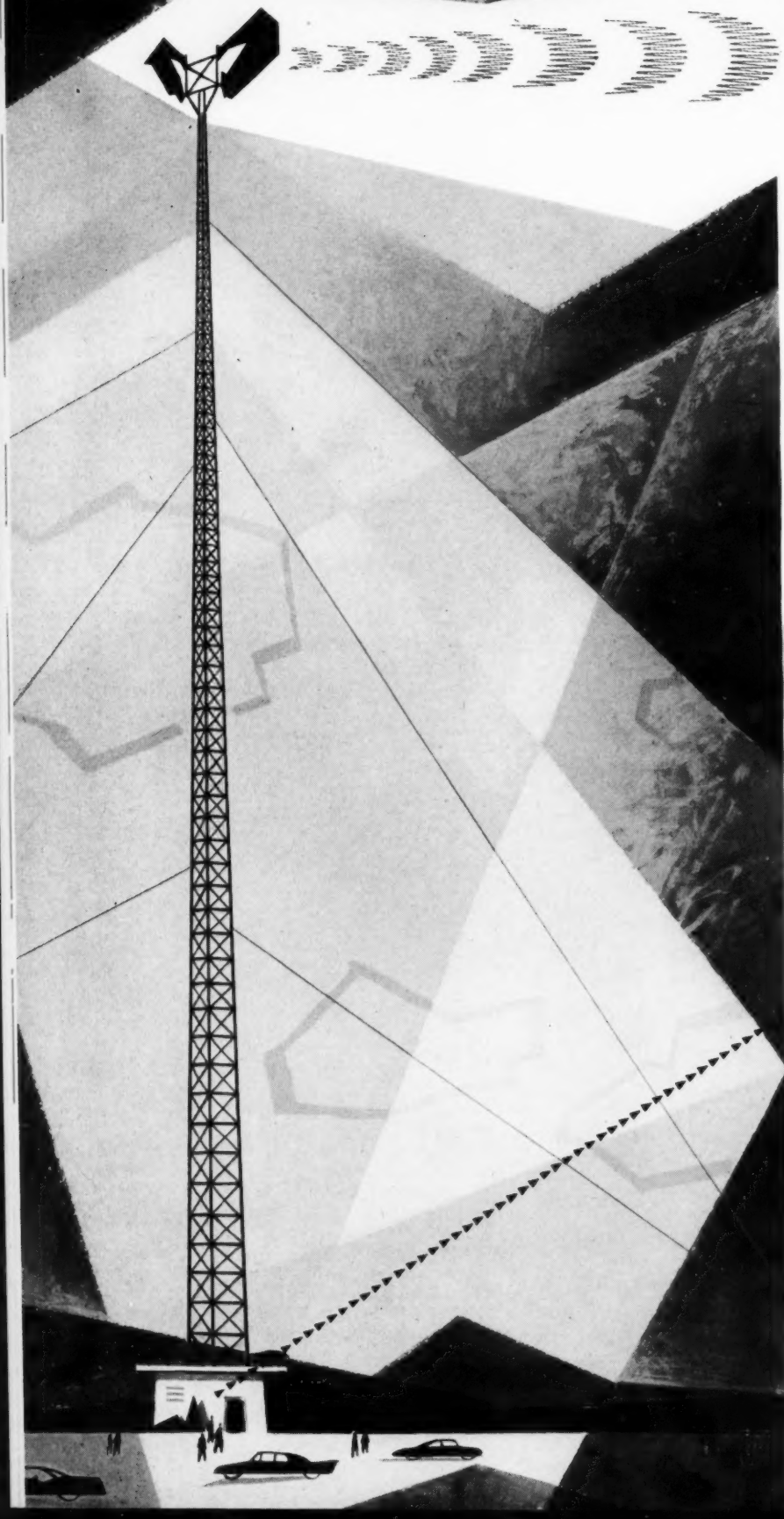
Head of bottom attachment bolt locks in place, will not turn as nut is tightened. Attaches over rod or strand. Attaches to clamp by substituting protector bolt for clamp bolt.

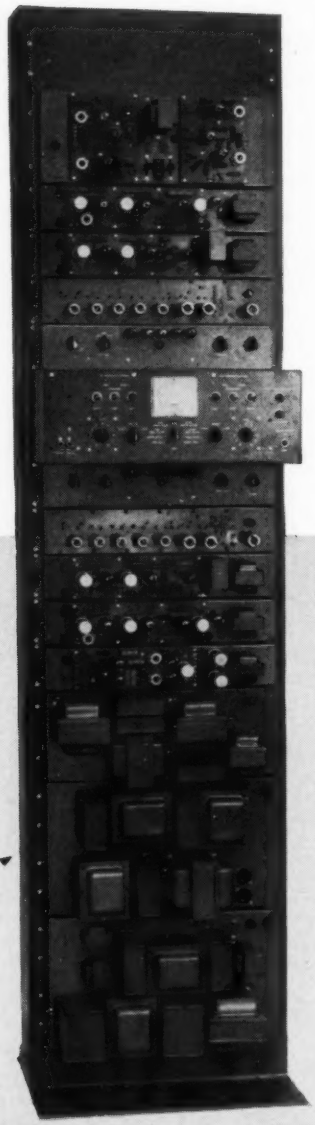
HUBBARD AND COMPANY

Pittsburgh 1, Pa.
Chicago, Ill.
Oakland, Calif.
Plano (Dallas), Texas

PHILCO *Announces*

NEW CLR-9 HIGH C





The CLR-9 terminal (shown with covers removed) consists of wave-guide and preamplifier, IF assembly, baseband drop, modulator, reflector control, servo, master control and tubeless power supplies.

XUM

GH CHANNEL DENSITY MICROWAVE

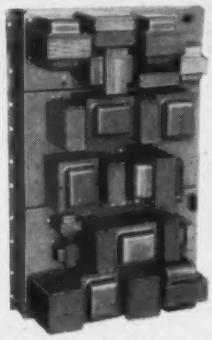
WITH 240 VOICE CHANNEL CAPACITY

Here is high channel density and outstanding reliability of operation—plus individual Automatic Standby for transmitter and receiver. The new Philco CLR-9 Microwave System is designed for quick installation in standard relay racks . . . and engineered with built-in metering and accessibility to all critical test points for easy field maintenance.

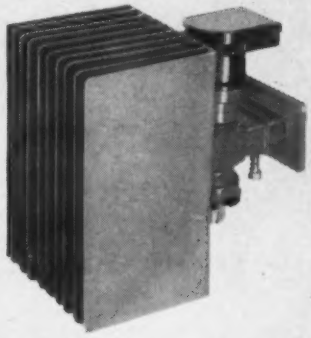
Performance reliability is sharply increased by the use of tubeless power supplies—new semiconductor rectifiers replace tubes. The use of printed wiring panels increases circuit stability—printed circuitry is keyed for easy identification—may be quickly replaced by maintenance personnel (permits efficient, centralized depot maintenance). Klystrons in the new CLR-9 are cooled by convection . . . the use of more compact heat sinks eliminates the need for bulky blowers.

The CLR-9's 240 voice channel capability is maintained even in repeater operation, to provide full duplex transmission and reception in both directions. Integrally mounted standby equipment is included.

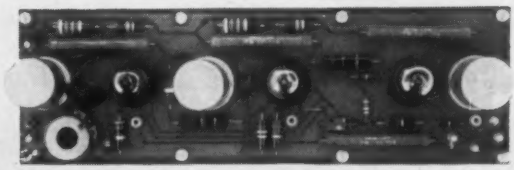
- **A new dimension in communications reliability . . . for continuous unattended operation.**
- **Baseband capacity for 240 channels or more.**
- **Peak performance at moderate cost—power supply capacity sufficient to accommodate both primary and standby equipment.**
- **Duplex transmission of wideband composite multiplex voice signals.**
- **Incorporates new low noise conversion and preamplifier circuitry.**
- **Integrated, fast, automatic standby selection included in one rack with individual back-up for transmitter and receiver functions.**



Heavy-duty, tubeless power supplies increase reliability by employing semiconductor rectifiers—assures minimum maintenance and very moderate operating cost.



Heat sinks cool the Klystrons by convection—compact CLR-9 needs no bulky blower system.



Rugged printed wiring panels increase circuit stability—easy identification simplifies maintenance.

PHILCO®

Government & Industrial Division

Philadelphia 44, Pennsylvania

In Canada: Philco Corporation of Canada Limited, Don Mills, Ontario

Courts and Commissions

Extension Installation Charges Waived in Neb.

The General Telephone Co. of Nebraska, Columbus, received permission from the Nebraska Railway Commission on July 19 to waive installation charges on extensions under certain conditions, in order to advance its sales program. The conditions are:

(1) When a residence extension is installed at the same time as the residence primary station.

(2) When more than one residence extension is installed at the same time, the installation charge applies only to one extension.

(3) When the main station is changed incident to the conversion of the exchange to dial operation.

West Coast Company Gets OK on $3,000,000 Bond Issue

The West Coast Telephone Co., Everett, has received authorization from the Washington Public Service Commission to issue and sell 3 million dollars in first mortgage bonds. The proceeds from this sale will permit the company to carry out plans during 1957 for the largest construction program in its history (TELEPHONY, July 20, p. 36).

L. Gray Beck, vice president-operations, stated that the construction requirements for additional plant during 1957 will amount to approximately $11,982,670. The record expenditure will be allocated to the areas served by the company in Washington, Oregon and California.

The bond issue carries an interest rate of 4⅞ per cent with a maturity date of Nov. 1, 1985.

Stock Issue Authorized For N. C. Independent

The Guilford Telephone Co. of Guilford College, was authorized by the North Carolina Utilities Commission on Aug. 1 to reduce the par value of its common stock from $100 to $1.00 per share, exchange the $1.00 common stock for stock and stock subscriptions presently outstanding for an amount not to exceed the book value of the stock and subscriptions as of last Dec. 31, and to sell additional shares of common stock up to a total of 300,000 shares.

The company, which serves about 1,000 customers, said it will use the proceeds of the stock sale to pay off bank loans and improve its facilities.

Wisconsin Companies Ask to Purchase, Raise Rates

The Wisconsin Public Service Commission on Aug. 6 was to hear the application of the Retreat and Southeastern Telephone Co. to purchase the Vernon Telephone Cooperative.

The commission on Aug. 7 was to consider the application of Somerset Home Telephone Co. for authority to increase rates.

On Aug. 9 the Pigeon Valley Farmers Telephone Co. was to have a hearing on its application for authority to increase rates.

N. D. Association to Buy Two Minnesota Companies

The Minnesota Railroad & Warehouse Commission on July 30 authorized the Manston Telephone Co. to sell its entire telephone property to the Barnesville Rural Telephone Association, Abercrombie, N. D. The Manston company serves about six stations.

The commission on the same date gave the Deerhorn Farmers Telephone Co. permission to sell its entire property to the Barnesville association. The Deerhorn company serves about nine stations.

Cable to Link America, France, Germany Next Year

A telephone coaxial cable linking America with France and Germany will be laid across the Atlantic starting next year, it was reported on July 28. The 2,500-mile-long strand will extend from Penmarch, near Brest, to Sidney Mines, Canada, with a relay station in Newfoundland. A land line will connect the terminal in Canada with the United States.

It will cost about 40 million dollars and contain 36 circuits, boosted by 50 amplifiers at different points along the ocean bottom. It is expected to be ready for use by late 1959.

Up to now Great Britain has had the only underwater cable to America capable of carrying voice conversations.

Cuts Two Wash. Exchanges To DDD; Plans Full DDD

In its Snohomish and Burlington, Wash. exchanges the West Coast Telephone Co., on Aug. 17 and 24, respectively, will cut into service new Direct Distance Dialing (DDD) systems, Lloyd Wallgren, district manager for the company, has announced.

Installation of the DDD systems will enable subscribers in the two cities to dial direct to any telephone in a network that includes 31 cities and communities. On Sept. 14, the remainder of the exchanges in this network will be converted to DDD operation.

"At the present time some 50 major American cities and their tributary areas, are now enjoying DDD service," Mr. Wallgren stated.

Radio-Telephone Available Between Bulgaria and U. S.

Radio-telephone service was made available on Aug. 1 between Bulgaria and the United States, according to an announcement by the Long Lines department of American Telephone & Telegraph Co.

The announcement said calls to the Balkan republic were routed through Linz, Austria.

The cost, exclusive of tax, of a three-minute call to Bulgaria from anywhere in the United States is $12.

Raise Denied W. Va. Company

The West Virginia Public Service Commission turned down on July 17 an application by Tygart Valley Telephone Co. to increase its rates.

The commission order said that the company's present rates are "just and reasonable." Its 500 subscribers in the

XUM

sierra

Peak-reading and average-reading
WATTMETERS—POWER MONITORS

Sierra 195A-Z Termination Wattmeter

TERMINATE RF COAX SYSTEMS

MEASURE RF POWERS

MEASURE INCIDENT, REFLECTED POWERS

MATCH ANTENNAS, LOADS

SIERRA TERMINATION WATTMETERS

Sierra 195A series Peak-Reading Termination Wattmeters are rugged, conservatively rated instruments specifically designed for measuring peak powers and terminating rf coaxial systems in testing and adjusting pulse transmitters and oscillators. They are designed for maximum reliability and minimum rf leakage. Three basic models cover 250 MC to 1000 MC and have characteristics given alongside. All require a 110 v 60 cps power source.

Sierra 185A series Average-Reading Termination Wattmeters are also offered for average-power measurement or termination on rf coaxial systems. The table at right gives models, frequency coverage, etc. No auxiliary power is required.

MODEL 195A PEAK-READING WATTMETERS

Model	Frequency	Peak Power, Kw	Max. Average Power	Connector
195A-Z	250-1000 MC	0-1/3/10	15 watts	N
195A-X	250-1000 MC	0-10/30/100	100 watts	LC
195A-Y	250-1000 MC	0-100/300/1000	500 watts	LC

MODEL 185A AVERAGE READING WATTMETERS

Model	Frequency	Power Range, Watts	Max. Power Dissipation	Connector
185A-15FN	20-1000 MC	0-5/15	15 watts	N
185A-100FN	20-1000 MC	0-30/100	100 watts	N
185A-500FN	20-1000 MC	0-150/500	500 watts	N

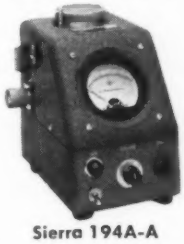
Note: 185A series accuracy ± 5% full scale maximum VSWR 1.2. 195A series accuracy ± 10% full scale, pulse width 1.0 μsec minimum, repetition rate 400 pps minimum. Female connectors standard.
Sierra also manufactures calorimeter wattmeters; details on request. Data subject to change without notice.

BI-DIRECTIONAL POWER MONITORS

Sierra Power Monitors are convenient, versatile instruments for measuring incident or reflected power, or precise matching of loads to lines. A twist of the wrist selects incident or reflected power, or any power range. Compact, rugged construction makes these instruments ideal for portable field applications or laboratory use.

Peak-Reading Sierra 194A-A Bi-Directional Peak Power Monitor reads 0-1/3/10/30 Kw from 200 MC to 1215 MC. Minimum pulse width 1.0 μsec, minimum repetition rate 400 pps, accuracy ±10% full scale. Insertion VSWR 1.10 maximum. Requires 110 v 60 cps power source.

Average-Reading Sierra 164 series Bi-Directional Power Monitors cover 25 MC to 1000 MC with as few as two plug-in elements. Each plug-in covers broad frequency range and has full scale power ranges of 1, 5, 10 and 50 watts or 10, 50, 100 and 500 watts. Power is read direct on linear scale within ± 5% full scale. Insertion VSWR less than 1.08 (Type N connectors) except on 1 watt ranges. 50 ohm impedance available with Type N or UHF connectors. No auxiliary power required.



Sierra 194A-A

Sierra Electronic Corporation

A Subsidiary of Philco Corporation

3885 Bohannon Drive DAvenport 6-2060 Menlo Park, California, U.S.A.

Sales Representatives in Major Cities

Canada: Atlas Radio Corporation, Ltd., Toronto, Montreal, Vancouver, Winnipeg

Export: Frazar & Hansen, Ltd., San Francisco, New York, Los Angeles

4095

sierra

Huttonsville and Mill Creek areas pay rates ranging from $2.00 to $3.00 it was reported.

44th Ocean Vessel Installs Ship-to-Shore Telephone

Ship-to-shore telephone service has been made available to the S.S. Conte Grande, the Long Lines department of American Telephone & Telegraph Co. announced on Aug. 1.

The Italian Lines' 23,842-ton vessel is the 44th passenger vessel to which high seas telephone service is being provided, Long Lines added.

W. S. Sparling Elected President of Ohio Bell

Walter S. Sparling, operating vice president of Ohio Bell Telephone Co. since 1952, was elected president of the company effective Aug. 1. He succeeds John A. Greene.

Mr. Greene, president since 1952, was named chairman of the board. He will retire next summer under the company's automatic retirement-at-65 policy. Previously he was president of Michigan Bell Telephone Co.

Gordon N. Thayer of New York, chief engineer of American Telephone & Telegraph Co., will succeed Mr. Sparling as operating vice president.

Mr. Sparling has been with Ohio Bell for 36 years, beginning as a lineman in 1921.

Harold R. Huntley was named chief engineer. He has been director of the customer products planning division of AT&T. He began his telephone career as a transmission technician for the Wisconsin Telephone Co.

Traffic Accident Fact

Bad driving conditions prevailed in less than 15 per cent of the fatal highway accidents in the U. S. in 1956.

REA Loans $1,890,000 for Rural Service in Four States

Three loans approved by the Rural Electrification Administration the week of July 22 will provide more than 1700 rural families with their first telephones and improved service for some 1800 others in Minnesota, North Carolina and Michigan, the U. S. Department of Agriculture has announced. These loans total $1,410,000. Combined with prior REA loans they will provide new or improved telephone service for more than 4500 rural subscribers.

In addition, REA approved a fourth loan in the amount of $480,000 to rebuild the Cameron Telephone System, in Louisiana, which was badly damaged by Hurricane Audrey. Details of the loans follow:

Cameron Telephone Co, Sulphur, La.; $480,000 loan, to rebuild and repair telephone plant destroyed and damaged as a result of Hurricane Audrey (July 24).

The company will use the new REA loan to pay for reconstruction of its telephone system in Cameron Parish and adjoining territory to the north of the coastal area. The storm demolished three of the company's six modern automatic exchanges, and destroyed about 150 miles of distribution and toll line. Two-thirds of the stations were put out of service by the disaster.

Rebuilding and restoration of service was started at once. A temporary exchange building housing a 50-line switchboard with three trunks is in operation at Cameron. There is no change at this time in the company's service plans except certain design revisions to prevent or minimize future storm damage. These would include buried cable and poured concrete buildings.

The new loan will bring total REA financing to $1,894,000. The company had already begun repayment of its first loan prior to the hurricane.

William L. Henning is president and manager of the Cameron Telephone Co.

•

Ace Telephone Association, (successor to the Fillmore County Telephone Cooperative), Houston, Minn.; $321,000, fourth loan.

This loan will be used to finance the acquisition, improvement and expansion of facilities of the Farmers & Merchants Telephone Co. of Lanesboro, which provides common battery and magneto service to 530 rural subscribers, including 167 switchers. The acquisition was made recently under interim financing.

To serve the acquired territory and 99 farm families now without telephones, the Ace Telephone Association plans to construct an automatic central office at Lanesboro. The switchers plan to abandon their facilities and become regular subscribers of the borrower as soon as service is available. A portion of the loan will be used to purchase a lot and to construct new headquarters facilities in Houston to serve the whole system.

The present and previous REA loans to this borrower, totaling $1,816,000, will provide new and improved service to 4,225 rural subscribers. The system will consist of 846 miles of line and 11 automatic exchanges, of which eight are now in operation.

J. H. Lewis is president and Robert Bunke is manager of the Ace Telephone Association.

•

Pinebluff N. C. Telephone Co.; $29,000, second loan.

The borrower plans to use these funds to complete construction of the system authorized under the initial loan of $132,000 approved in July 1956. In addition, the loan provides for new line and extra storage space at headquarters.

With its two REA loans, the company will be able to furnish new and improved telephone service to 318 rural subscribers.

Mrs. A. G. Wallace is president of the Pinebluff Telephone Co. and E. H. Mills is the manager.

•

Whiteford Telephone Co., Whiteford Center, Mich.; $1,060,000, first loan to extend and improve rural telephone service (July 26).

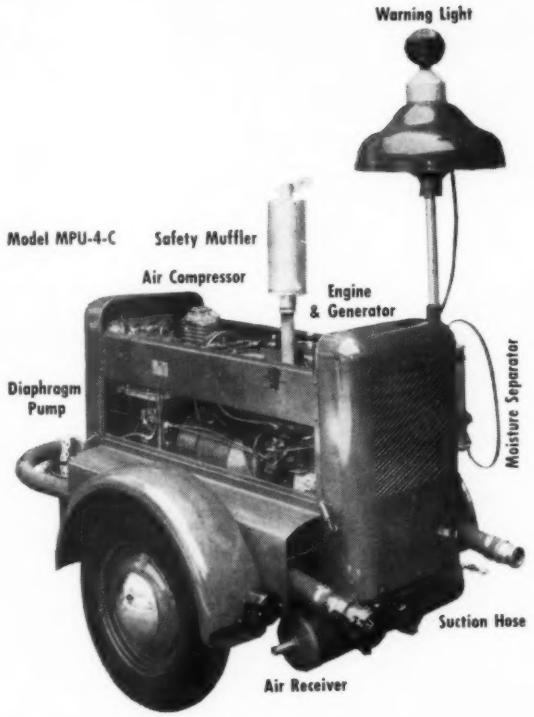
The new borrower plans to use these funds to furnish telephone service to 1,688 farm families now with no telephones, and to improve service to 1,301 existing subscribers. The present system consists of a magneto exchange at Whiteford Center and automatic facilities at Samaria.

The borrower proposes to construct a combination headquarters and automatic central office building near Lambertsville to serve the entire area. The present automatic switchboard at Samaria is inadequate for use in the enlarged system and will be sold.

Edward H. Daverman is president and Frederick W. Krumm is manager of the Whiteford Telephone Co.

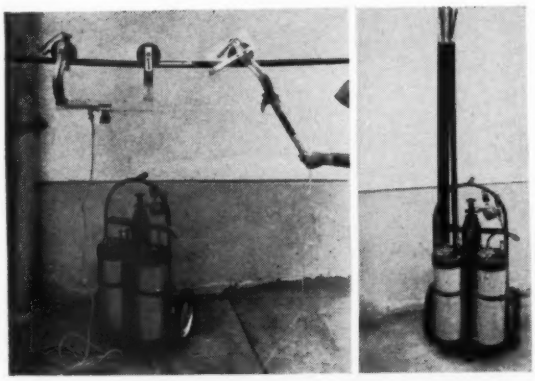
S&G designs for you

and your specific needs



MOBILE POWER UNIT
(Model MPU-4-C)

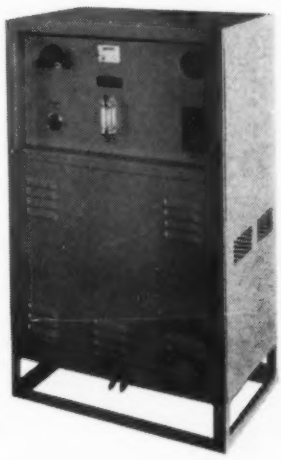
- Generator slow speed for quietness
- Pump—Diaphragm type to remove seepage and drain back
- Air Compressor—to put cables under pressure for cutovers or repairs
- Furnished with or without pump and compressor
- 300-Watt floodlight illuminates working area
- operates soldering pot and iron, electric and air tools
- electric blower to ventilate manhole
- supplies dry air for cable cutovers, flash testing, etc.
- diaphragm pump can be operated from manhole by push button control
- buzzer signal for summoning helper
- light, easy to handle



LEAK DETECTOR APPLICATOR
(Model LD-1 & LD-2)

Both models use highly successful chemical type leak detector. Applicator's dual nozzle sprays both sides of pressurized cable, giving 100% coverage. Bubble cluster forms around leak within minutes and can be clearly seen from the ground. Air pressure bottle in cart supplies regulated pressure in solution tank at all times, can be adjusted for different heights.

MODEL A
Air Compressor Dehydrator



Exchange equipment designed to supply chemically dry air for telephone cables, aerial and underground, this unit can supply as many as 30 cables. The unit is equipped with volume recording air meter, high and low pressure alarm switches, humidstat and hour meter.

- **Completely automatic in operation**
- **Air purifier to eliminate oil mist**
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Says Teenagers Built 1886 Line in Buffalo

You won't find it recorded in the history books, but one of the first telephone lines in the world was strung through the streets of Buffalo by a group of teenagers, so reports our New York State Correspondent, George E. Toles.

In 1886, only 11 years after Alexander Graham Bell "talked through a wire," the line was run from old Police Headquarters on the Terrace over Pearl, Tupper, Connecticut, Prospect, Vermont and West Sts. to Ft. Porter.

Designed as a telegraph line, it was so successful the Postal Telegraph Co. used it when its circuits were busy. In return, the company supplied the ten teen-age owners with 130-volt current.

One of the young electricians, Frank L. Thebaud, still lives in Buffalo at 44 Norway Park. Now 86 years old, he remembers every detail of how the line was converted to carry sound rather than the dots and dashes of Morse code.

"We screwed the sounder down until there was only one or two thousandths of an inch clearance," Mr. Thebaud recalls. "Then we made a microphone by fastening three pieces of carbon to a board."

Much to their surprise, the primitive telephone actually worked. When someone talked into the homemade microphone, all the sounders along the line reproduced the voice.

"It had a regular telephone sound, except you could hear it all over the room," Mr. Thebaud says. "It was so sensitive you could set a watch down near the microphone and hear the ticking."

Since one end of the line was in Police Headquarters where all fire alarms were received, Mr. Thebaud and his friends planted one of their microphones near the fire gong.

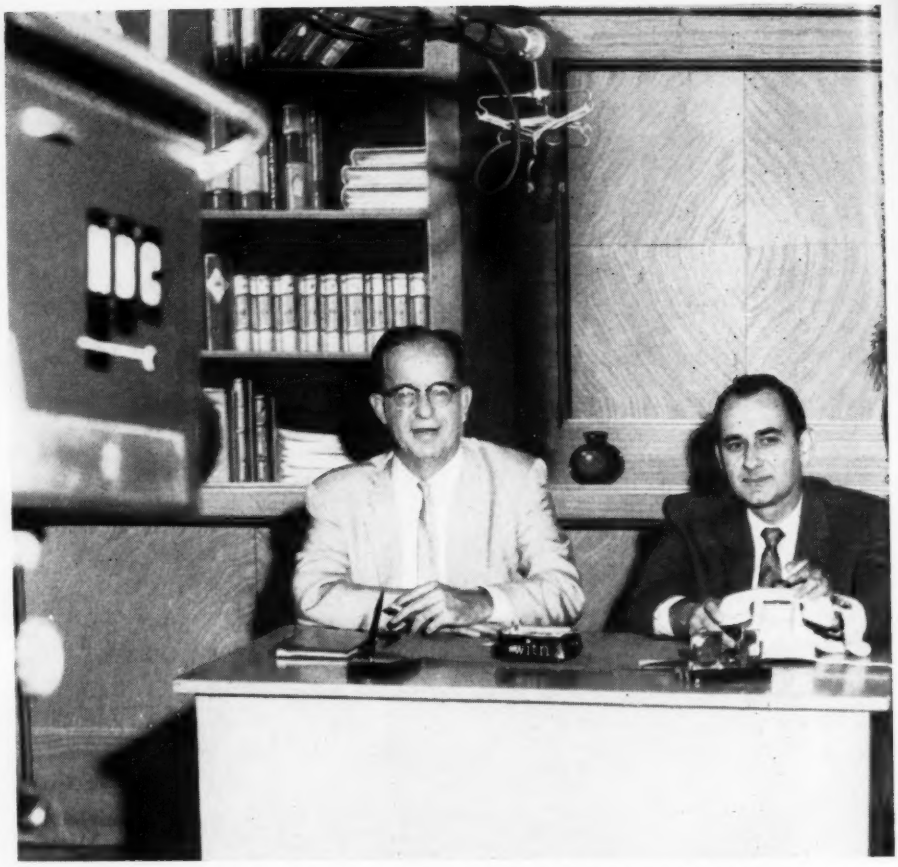
When the fire gong clanged an alarm, the telegraph sounders buzzed it out in the houses of ten boys.

Later Mr. Thebaud put his early interest in electricity to work in partnership with the late John Churchill. First they installed battery operated lighters to turn on gas lights. Later they installed electricity in homes and stores.

Carolina T&T Televises Cut-Over of Exchange

When Carolina Telephone & Telegraph Co. converted its last large exchange to dial recently, this important event was televised for the whole community to see.

The first local call over the new system was from Mayor Tom Stewart of Washington, N. C., to Mayor Ed Mann, of the adjacent Washington Park community.



H. Dail Holderness (left), president of Carolina Telephone & Telegraph Co., is shown seated with Mayor Tom Stewart of Washington, N. C., just prior to televising the first dial call to be made over the city's new automatic system.

Through special arrangements, the television screen was split so that the television audience could see both mayors as they talked to each other. Both commended the company highly for establishing dial service, also the Washington telephone employes for the excellent service provided in past years when operation was on a manual basis.

Also featured in the ceremony was H. Dail Holderness, president Carolina T&T, who dedicated the system. In receiving the call, Mayor Mann was accompanied by the local telephone manager, A. L. Champion.

Conversion of the Washington system to automatic (2-5 numbering) follows some two years' work by the Carolina company, resulting in an expenditure of over 2 million dollars in the Washington area. Less than one per cent of the company's approximately 150,000 telephones are now manually operated.

Obituary

D. W. T. PATTON, 71, retired general plant superintendent of the Standard Telephone Co., Cornelia, Ga., died on July 31.

Mr. Patton had been associated with the Independent telephone industry since 1919. He was first employed by the Bluefield (W. Va.) Telephone Co., where he became a supervisor in the plant department. His subsequent positions were as general manager of the Jefferson County Telephone Co., Charlestown, W. Va.; division plant superintendent at Tallahassee, Fla., and Georgia manager of the Southeastern Telephone Co. at Fitzgerald, Ga. He had been retired from the Standard Telephone Co. since Dec. 31, 1956.

Mr. Patton is survived by his wife; and one son, Frank, of Charlottesville, Va.

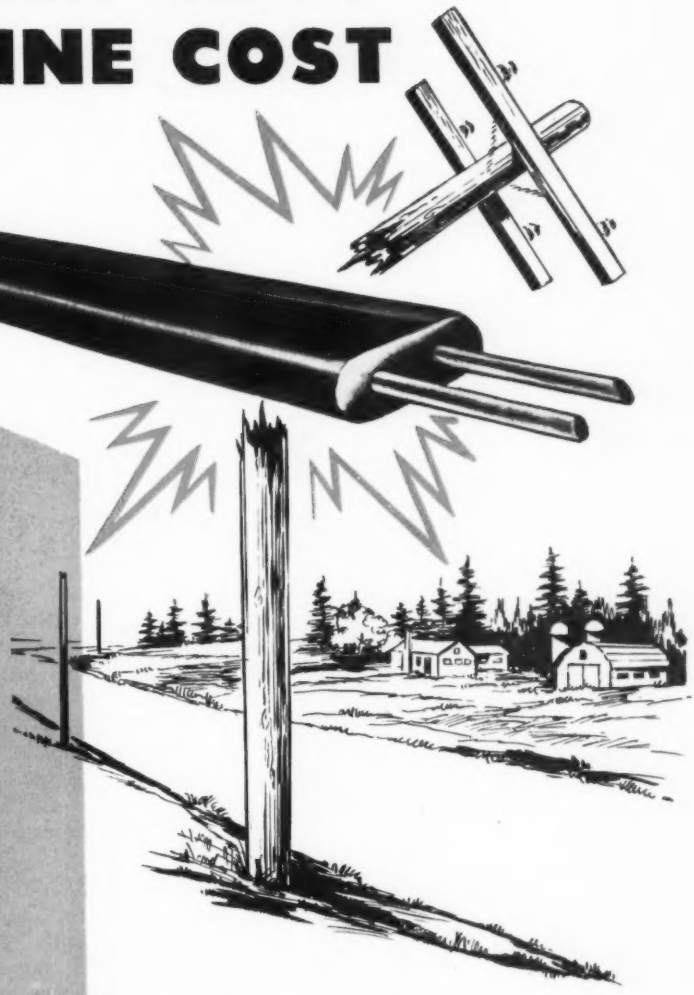
Book Review

PULSE AND DIGITAL CIRCUITS by Jacob Millman and Herbert Taub. 687 pages. $12.50. This book may be purchased from TELEPHONY.

This volume is one of a series on electronic engineering and is intended for senior and graduate courses. The subject of electronics has been introduced into electrical engineering curriculums in recent years in order to give the student a background in radio.

Radio, however, might be said to deal only with sine waves and their applications. However, the authors of

REX ONE PAIR CUTS POLE LINE COST



A Span lengths up to 600 feet are possible with Rex One Pair Distribution Wire. Extra service poles are eliminated on long extensions and long drop runs.

B Economically installed — no cross arms, pins, or glass insulators. Wire is simply installed on tangent supports and drive hooks.

C No tree leakage — a heavy extrusion of high molecular weight, high dielectric strength polyethylene, enclosing both conductors prevents accidental grounding and eliminates excessive right of way clearance.

D Excellent transmission characteristics — similar electrical properties to R.E.A. listed Rural Distribution Wire assure good subscriber service.

E Easily transposed — no special brackets; simply twist span at installation. Cross talk and induction noise are kept to a minimum.

F Ordering data: Two conductors #12 or #14 AWG Copperweld or .083 steel. 5,000 or 15,000 foot reels.

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SEND FOR TECHNICAL SPECIFICATIONS and PRICES

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INDEPENDENT

this book feel that separate treatment should be given the vast field of electronics which has developed outside of radio. This field includes such things as radar, television, computers, control systems, telemetering, data-processing, etc.

All of these involve the use of waves different from those used in radio. This text was developed from teaching material which has been in use by the authors for the past eight years. The approach in the book is that of explaining the building blocks by which various electronic pulse and switching circuits are made. Therefore it is not a book on just one subject, such as computers.

Instead, a thorough basic knowledge is imparted about linear networks, the non-linearity of tubes and transistors and their effect on waveforms. Waveform generating circuits of all sorts are probed and explained, and fundamental switching, gating and other circuits are explored. From the knowledge of basic components thus gained, these building blocks are put together to show their use in such things as radar, television and computers.

The philosophy of the authors is to analyze the circuits on a physical basis in order to provide an intuitive feeling for its behavior, which is a quality often neglected in modern engineering.

Mathematics, through differential equations, is used where necessary, but only after the physical motivation behind the mathematics has been discussed.

This volume will be of particular interest to telephone engineers who want to get aboard the latest ideas on electronic switching, and others whose education in electronics stopped with radio.
—Reviewed by Harold McKay

SHORTAGE OF ENGINEERS

Concluded from page 32

of much sub-professional work, providing him more time for higher level engineering and supervisory work.

Studies made by the Engineer's Council for Professional Development indicate that up to eight technicians may be required for every engineer for full utilization of this nation's technical manpower.

The first accredited telephone technology course will be started by the Southern Technical Institute of Chamblee, Ga., in September (TELEPHONY, May 18). Similar courses are being considered by the Milwaukee School of Engineering at Milwaukee, Wis., and by others.

REA Endorses Courses

REA is of the opinion that the use of technicians in the field of telephone system design, construction, and operation and maintenance is one way that the shortage of technically trained engineers can be alleviated. REA is presently making considerable use of technicians in this capacity. Some consulting engineers employ technicians to assist their engineering personnel.

It is believed that the technical advances and developments in the telephone industry will be such that telephone technicians will find attractive and interesting work now and in the future. While the REA is not sponsoring these schools, it does endorse any and all activities designed to promote more technically trained personnel who can be made available to the telephone industry.

If trained telephone technicians are to be available for the industry, it is imperative that both the need for them and the availability of accredited training institutes be made known to high school seniors, recent graduates, and other interested people. It is believed that this need can best be made known by the industry itself, by its leaders through their local schools and societies, and through telephone associations.

Our good friend, Jack O'Shaughnessy, closes his appeal with the following statement: "The support and assistance of all concerned is urgently needed in publicizing the requirements for and the place of technicians in the telephone industry. All possible prospects should be urged to avail themselves of the specialized training now offered which will assist them in qualifying for such employment."

At Lemoyne, Pa., a few miles from Harrisburg, is located a modern, one-story school of 18 classrooms. Its students do not learn the three R's, nor do they pay tuition. Instead, this school, run by the Bell Telephone Co. of Pennsylvania, offers courses in linework, underground conduit and manhole design and construction, line assignment and other specialized courses for the training of its employes. It is estimated that every year, 1,600 people will spend from five days to four weeks learning the latest in methods, equipment and practices of the Bell System.

This school has a staff of 27 instructors.

High Schools Source

The son of the writer's barber graduated from high school this spring with high marks and immediately obtained a position with a large communication concern at a starting salary of $75 per week. Furthermore, this starting salary is paid while he is attending the company's school, and he will undoubtedly receive a salary increase soon after he has finished this course of instruction and has proved his proficiency on the job.

The present practice of obtaining the services of promising high school students and giving them a course of special instruction appears to have considerable merit. For the past several years there has not been an adequate number of college graduates to meet the demand, and the competition for these trained men by industry has been keen.

There have even been rumors that some concerns have placed promising students on their payrolls several months prior to graduation just to make certain they will obtain their services. Then there is the story—for which we cannot vouch—about the engineering graduate who informed the recruiter from industry: "Certainly I will consider employment with your company. Just submit a sealed bid on your offer along with all of the rest."

The proper utilization and special training of well-qualified high school graduates should help materially in alleviating the present engineer and technician shortage until a better training plan can be placed in operation and begin to produce results.

Some members of the telephone industry may contend that we cannot afford to pay the cost of this special training of engineers and technicians. In this connection, we should realize that the only thing more expensive than education is ignorance. Monies carefully expended for the proper training of the desired type of individual should pay big dividends to any segment of our industry.

Opportunity Assessed

"They do me wrong who say I come no more,
When once I knock and fail to find you in;
For every day I stand outside your door
And bid you wake, and rise to fight and win."—JUDGE WALTER MALONE.

Prescription for Old Age

"There is no joy in retirement except some kind of productive work. Otherwise you will degenerate into talking to everybody about your pains and pills and income tax . . ."—HERBERT HOOVER, *former president of the United States.*

XUM

A Selected List of Telephone Books

• ***Transistor Audio Amplifiers*, by Richard F. Shea; 219 pages $6.50**

The practical applications for which transistors are already eligible are covered in this book. It discusses specifications, performance curves, and specific design data. In a fairly simple introduction, the author writes for the engineer who is making the transition between vacuum tubes and transistors.

• ***National Electrical Code Handbook*, by Arthur L. Abbott; 633 pages (new eighth edition) $7.50**

Planned to enable electricians to understand the National Electrical Code and to do work in accordance with it. Gives all Code requirements, restating involved rules in simple language, plus explanations, practical directions and diagrams, showing what the rules mean and how to apply them.

• ***American Electricians Handbook*, by Terrell Croft; 1,773 pages (sixth edition) $10.00**

This book covers everything from fundamentals of electricity to practical suggestions for remedying the troubles of electrical equipment. Discusses electron tubes and circuits, fundamentals of construction, operation, and application of electronic devices in industry, control generators (Amplidyne and Rototrol), electronic control of motors, automatic electric drive control, synchros, dry-type transformers, copper-oxide and selenium rectifiers, Signalite fuses, thermoplastic insulated wire, load-center industrial distribution systems, fluorescent-lamp developments, and farm wiring. All material is in accordance with the National Electrical Code.

• ***Cost Reductions in Communications*, by Roy Stone (1953); 342 pages $10.00**

This book is written for business concerns and tells them how they can get the most in telephone service for their money, and how the most efficient service can be had from the large selection of apparatus and services which telephone companies can supply. It should be in all telephone company libraries and in the hands of large business users of telephone service.

• ***Essentials of Microwave*, by Robert B. Muchmore; 236 pages $4.50**

Provides a broad understanding of the subject and stresses physical principles that underlie operation of microwave devices. Covers electromagnetic laws of Maxwell, characteristic waves, wave guides and antennas, cavity resonators and filters, typical microwave antennas, waves and electron streams, and grid-control tubes. Basic concepts and applications of klystrons, traveling-wave and multiple-stream tubes, magnetrons, and radar are also included. Electrical noise, microwave radio systems and measurements, relays, and applications of microwaves in physical research are among other subjects treated.

• ***How to Pass Radio License Examinations*, by Charles E. Drew; 464 pages (third edition) $5.75**

Supplying essential material required for Federal Communications Commission examinations, this book now provides sections on Elements 7 and 8, covering information on technical, regulatory, and operational practices in the application of aeronautical communication and navigation as well as the use of radar in the marine service. Question-and-answer arrangement also supplies material required for radio-telephone restricted operator permit, radio-telephone third-class operator permit, and radio-telegraph third-class operator permit in Elements 1, 2 and 5. Further information is given for those preparing for first and second-class radio-telephone and radio-telegraph operator licenses.

• ***Storage Batteries*, by George Wood Vinal; 446 pages; illustrated (fourth edition) $10.00**

The many technological advances in battery design and construction in the last 14 years are discussed in this new edition. It gives a clear, practical presentation of the principles of operating storage batteries, covering charging and discharging, and all their variations: constant current charge, modified constant potential charge, boosting, equalizing and trickle charge, floating and system-governed charge, gas evolution, and the effects of high and low temperatures.

• ***Elements of Electricity*, by William H. Timbie; 631 pages (fourth edition) $5.50**

Presents useful electrical engineering material in a clear, physical way, without depending heavily on mathematics. In adding modern material to show present-day applications of the principles, there are revised sections on circuit analysis, direct-current machinery, electrochemical processes, and gaseous conductors. There also are discussions of aluminum wire, ceramic capacitors, transistors, radar, television, dry and gaseous rectifiers, and other points that typify the change and progress since 1937 edition.

• ***Human Behavior in Industry*, by William W. Finlay, Dr. A. Q. Sartain and Willis M. Tate; 242 pages .. $4.00**

This book takes a realistic look at people on the job and what makes them act as they do. The authors point the way to more effective handling of problems arising in such situations as dealing with unions, selecting and evaluating people, disciplining and making the job attractive and significant.

• ***The Lineman's Handbook*, by E. B. Kurtz; 790 pages; illustrated (third edition) $10.00**

This practical manual describes in detail all steps in locating, erecting, testing, inspecting and maintaining electrical transmission and distribution lines. Both the apprentice and the experienced lineman will find in it a wealth of facts to help them do more efficient work, presented in simple, easy-to-understand fashion. Among the subjects included are: Electrical fundamentals, line materials and equipment, fundamentals of line design, mounting crossarms, pins, and insulators, installing transformers and lightning arresters, tree trimming, accident prevention, and lineman's arithmetic. Completely new or extensively revised sections cover tower line erection, live line maintenance, rural lines, pole climbing, use of rubber protective goods, rope knots and splices, gear signals for line work, ground and pole top resuscitation methods, and electrical formulas and calculations.

• ***Three Books on Employe Training and Supervision*, by Harry C. Walker**

(1) Off-Job Training $1.75

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- (a) Oral Expression in Supervision 1.00
- (b) Functional Element in Supervision 1.00
- (c) Human Element in Supervision 1.00

(3) The Analysis and Presentation of Engineering Problems (2 Vol.) 2.50

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by Walter G. Baum, Office Mgr. and Inside Sales—Kansas City

Although I'm from Missouri, nobody has to show me how much careful attention is paid to your supply needs at Stromberg-Carlson. You might be interested to hear why. Well, these orders of yours for parts and equipment, actually help further the science of telephony. We're up to our neck in this industry as a full-time job. We appreciate your support—because your supply business plays a major role in helping us continue our research for new and better telephone equipment—**for you.**

Insure your power supply

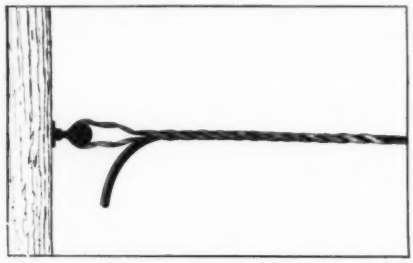
Because Planté batteries practically last forever...providing standby power that never fails...they're the best operating insurance you can buy. In switchgear, signal and alarm systems, or emergency light and power applications, these lead batteries have rolled up amazing performance records . . . are famous for their ability to deliver a powerful surge or a steady flow of current the instant it's needed. Make sure you're in operation . . . always. Choose Gould Planté.

A sure, dependable supply of power when you need it. That, briefly, is the story of this Gould Planté battery.

Low radial pressure assures positive grip

You get positive gripping action on 2 No. 14 and 2 No. 12 Copperweld and 2-.083 Steel C Rural conductors with Preformed C Rural Dead-Ends.

Low radial pressure over the entire holding area prevents slipping or damage to conductor insulation. The multiple wire loop provides extra strength.



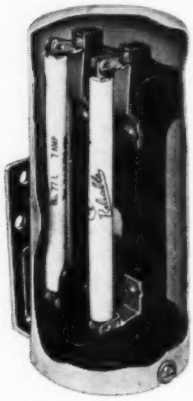
Neoprene coating over stainless steel prevents corrosion or abrasion.

PLP C Rural Dead-Ends are easy to apply by hand—no tools needed. You simply insert one leg through the eye-bolt, then wrap on the legs.

Ask your Stromberg-Carlson representative about Preformed C Rural Dead-Ends.

New Design Station Protector

For a station protector with really new features, specify the Reliable Series 2000 Protector.



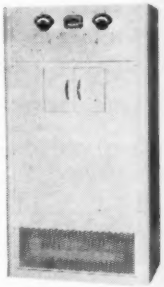
All metal parts are bronze, aluminum or stainless steel.

This new protector replaces the Series 1000—and only the time-proved Reliable Discharge Blocks and Fuses remain unchanged. Quality and performance are better than ever.

The new protector comes with a phenolic fuse mount (rather than porcelain); a flexible neoprene base with integral wire entrance sealing slots (instead of open wire holes); and a redesigned fuse mount and terminal post that permit putting wiring snugly in place without removing fuses. The fuse mount can be easily reversed to wire from right or left.

Battery charger pays for itself, saves 3 ways

If you're interested in saving money, and still keeping up a good supply of battery power, here is real help for you. It's the Flotrol three-phase automatic constant voltage battery charger manufactured by Lorain Products Corporation.



Charger provides constant voltage, no moving parts.

You save power. Whether charging current is heavy or light, the Flotrol maintains an exceptionally high efficiency. For example—even as low as 10% of its rated load, the Flotrol operates at 50% efficiency! Often, power savings pay the full cost of the Flotrol.

You save maintenance. With no moving parts, you don't have to lubricate or replace any worn components. You simply install the Flotrol and forget it.

You save your batteries, too. By providing a constant voltage, the Flotrol keeps your batteries fully

XUM

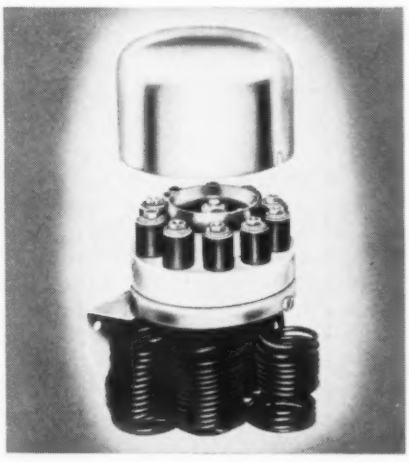
charged, yet prevents overcharging. If a heavy overload is placed on the Flotrol, the output current is limited to a value which will not damage the battery or the Flotrol.

Easy to install, too. Just move the cabinet into position, and make five connections at conveniently located terminals (3 AC power leads, 2 DC charging leads).

Protects 5 circuits at low cost

You get low-cost protection for 5 circuits with Cook Electric Company's Hy-Cap Power-Cross Protector—a single compact unit with only one ground wire.

In the assembly of this unit 10 carbon electrodes are fixed to a porcelain base which has a snug-fitting, weatherproof aluminum cover. Each electrode has a fusible element which forms a direct path to ground when an extended discharge occurs. Ten insulated copper wire leads are factory-connected to the protector and cut to correct lengths for installation on a 10B crossarm. Wire entrances are sealed with rubber grommets. A steel bracket makes mounting easy.



Protect 5 circuits with this one compact unit.

If all 5 wire leads are not needed at installation time, you can leave the extra wires coiled until facilities are increased.

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TONICS FOR SMALL EXCHANGES

Continued from page 24

the answer will come and it will be a professional answer recognizing the hard facts of the business. I recommend as one ingredient of a professional approach that we open our eyes to the demands of uniformly good service throughout the country by dividing tolls under uniform and current unit costs no matter who owns the plant.

There may be much weeping and gnashing of teeth at this revival of the doctrine of pricing equalization; but dial service itself was one heresy and the howls of dismay over station-to-station ideas are still ringing in our ears.

We are dealing with a coldly practical problem in accommodating the resident and businessman in the small town on a genuinely modern basis. The purist for pin-pointed actual cost, whatever that is, has had to maintain an eloquent silence when differentials between business and residence rates have widened and when big-city rates have been "spiked" to keep operations going out at the remote crossroads.

We believe that the purists' day is also expiring in this practical but inexact science of toll divisions. The small exchange, in particular, and our industry, in general, will emerge with new pride when we seize upon the realism, simplicity, and speed of cost averaging by states for comparable plant specifications and wage classifications. The barriers of inadequate accounting records, historical frugality in expense policies, and the dates of plant erection will also give way to the genuine service and revenue needs of these times.

I will not impose further upon your time with the mathematics of this proposal or its harmony with federal and state regulatory obligations except to assert and invite argument on the point that it will hold water any way it is tested. To be sure that these ideas are not misconstrued, however, I do wish to summarize briefly.

We are not suggesting any "fuzzy" averaging approach such as costs per circuit mile, costs per telephone, or any vague or composite cost concepts. We are suggesting solely that current unit prices for exact plant specifications and employe assignments be averaged on a statewide basis for the entire industry — not Bell costs nor average Independent costs, but the average by states for the business. Actual present level of annual charges on actual plant in service must be recovered in their due proportion from the toll segment of the telephone business if our performance standards are to measure up.

Financial Composition

In conclusion, I would like to make mention of the financial problems of the small exchange. One of the most unhappy phrases in the business is the all-too-common reference to "*distress situations.*" I feel that such situations are unnecessary, in that, where they occur, proper advice and foresight have been lacking internally in the companies involved and with direct reflection upon the rest of us in the business who have sat idly by while errors were in the making.

Possibly some consolidations of small systems, possibly revisions of toll interconnections, or even outright sales and mergers are healthy influences if they are motivated by voluntary planning of the operators of the small systems and systems having a preponderance of small exchanges.

Where such measures become compulsory as a last resort and are involuntary as a product of genuine distress, something is wrong. In this we all share some responsibility.

Such distress is invariably reflected in a financial dilemma, where credit has been exhausted and the ability to take advantage of either technical improvements through new investments or financial readjustment has become impossible. It seems to me that there is no company nor exchange too small in this business to make a special point to study and understand both current financial conditions affecting the business and the financial environment toward which any step in their financing leads.

The small exchange operator should be as alert as the management of larger exchanges and systems to resources and timing in the bond market and resources and timing in the equity market. He should be wary and know how to avoid resorting to abnormal fixed obligations either in excessive borrowings or perhaps excess preferred stocks. He should know better than to exhaust all of his financial margin before it is necessary, either in debt or in soaking up his local community popularity by selling his neighbors preferred stock just because it is the easy way.

Up to a point, these measures may be good and desirable but they can also be a most direct route to financial imprisonment. Maintaining a healthy financial balance means awareness that the easiest course oftentimes is the

worst one and a financial "spree" this year can very well be the makings of a real "hangover" next year or the years following. It seems to me that the telephone associations might be helpful in an educational program to ourselves — none of us are too well versed to keep hammering these ideas back into our heads—just to keep us all conscious of what a healthy capital structure looks like.

I should like to say a word about REA financing. This source can be desirable and, as a matter of fact, the life-blood of small exchange development so long as it is not overdone. This method of financing should not be permitted, because it is easy, to create such a proportion of debt as to close the door on financial flexibility. In the event of even a temporary economic decline excessive debt can have an unfortunate impact.

Another point to consider is that in contracting with government administrations we should perhaps question the continuity of policies, personnel, and attitude in government bureaus. We do have, at the present time, in my opinion, an outstandingly capable, realistic, and understanding administration and the environment is good.

This does not mean, however, that over the long-run different people and different policies may not be involved. This merely suggests moderation. Where REA financing does seem to be the answer, with cheap money and the facility of its acquisition outdoing private financing competition, it should be encouraged, as I see it, but only up to that point where private management can see and knows that he has an "out" in the event things go sour.

Conclusion

There is no panacea or "pat" answer for the small exchange. The "tonics" professed in my title are nothing but a large, and I trust well-directed, dose of hard work. Like everything else in the business, the magnitude of the result will be directly proportional to the sweat put into it.

Engineer wisely, hammer at exchange rates, push ahead on a consistent basis for a proper participation in toll revenues, use our sharpest pencils on preserving the best long-range financial structure; above all, since the quality of our public service and the ingenuity of private initiative itself are challenged, let us not be timid about any of these points.

Living Wisely

"And he that lives to live forever never fears dying."—WILLIAM PENN.

TELEPHONE WEEK

Concluded from page 29

Just a word of caution. If you plan to hold an open house, do it well or not at all. Such an affair, inadequately planned and loosely handled, might backfire. Plan everything carefully. Competent employes should be on hand and thoroughly trained to explain the workings of the exchange to all interested customers. And, last but not least, don't overlook the editor of the local newspaper and his staff. Give him a special invitation. If he doesn't bring a photographer, furnish one yourself —preferably a professional.

(For information concerning one of the more recent successful open house programs, see the July 20 issue of TELEPHONY, page 35: "Open House—Small Investment with Big Dividends.")

Opportunity knocks but once in a while. *Independent Telephone Week*, one of the highlights of USITA's 60th anniversary, offers every Independent telephone company an occasion to tie-in with us and to make capital of a national event, the like of which probably won't come along again for a long, long time.

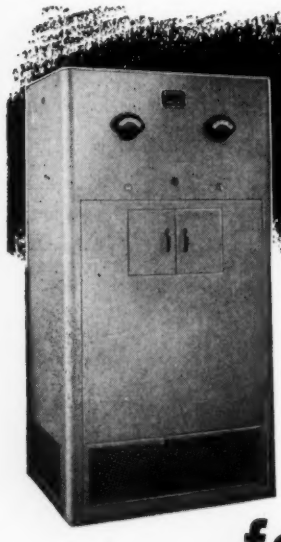
Stromberg Ships First Mobile Exchange

The first "piggyback" type of freight shipment to travel the rails out of Rochester, N. Y., was a mobile "telephone exchange on wheels" which recently was shipped by Stromberg-Carlson, a division of General Dynamics Corp., to the West Coast.

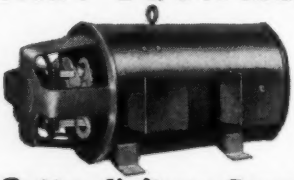
The mobile automatic telephone exchange, completely installed in a standard 37-foot highway transport trailer, is the first of five which Stromberg-Carlson is building. The other four will be shipped in the same manner, at approximately weekly intervals as installation of the equipment in the trailers is completed.

These telephone exchanges on wheels are complete automatic telephone switchboards, ready to go into operation as soon as the telephone cables and power supply are connected. Each exchange has a capacity of serving up to 1,000 telephone subscribers on an individual circuit basis, or several times that number on a party-line basis.

The mobile exchanges can—and do—serve several important functions in the nation's communications network. Occasionally they are hauled in alongside an existing central office, to augment the services provided by that office. In other instances they are used to provide telephone switching service



ADD A FLOTROL TO YOUR ROTARY EQUIPMENT



for: • Better Voltage Regulation • Sizeable Power Bill Savings

A telephone exchange now using DC generators for charging the batteries can add one or more FLOTROLS and immediately obtain the precise voltage regulation characteristics of the FLOTROL for the entire exchange. The high efficiency of the FLOTROL will greatly reduce power consumption during those hours of the day when the FLOTROL alone is sufficient to carry the entire load; generators can be shut off during light load periods, thereby reducing the wear on the rotating equipment. By installation of FLOTROL capacity sufficient to carry the entire normal load, rotating equipment showing signs of wear can be saved for standby service, continuing its life indefinitely. The advantages obtainable from this type of installation are tremendous. For further information, send for Bulletin 161.

LORAIN PRODUCTS CORPORATION
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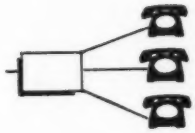
FLOTROL PARTNERS IN DEPENDABILITY SUB-CYCLE

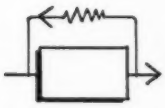
Pacemakers in the technology of our electronic age

Certain discoveries, inventions and developments of Bell Telephone Laboratories have been truly epochal in their effect upon the technology of our time. Each has come out of a single quest—a search for ways to make telephony ever better. But many have opened the way to exciting advances in TV, movies, radio, horology, astronomy. Here are ten of Bell Laboratories' contributions to the modern world.

Electronic amplifier. First high-vacuum electronic amplifier. Made possible long distance telephony and then opened the way to radio broadcasting.



Wave filter. Precisely separates bands of frequencies. Provided major key to economical sharing of the same wires by many voices or radio programs. Indispensable control tool in radio, television and radar.



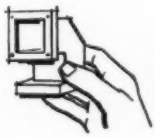
Negative feedback amplifier. Provides distortionless and stable amplification. Made possible the enormous, precisely controlled amplification needed in long distance telephone calls. The principle is now basic in high-quality amplifiers for radio, TV and high-fidelity reproduction.

Quartz crystal. Standard super-accurate quartz crystal oscillator developed for frequency controls in radio telephony. Has also become the standard control for clocks in world's astronomical laboratories.

Coaxial cable system. Hollow tube with a central conductor was developed to transmit hundreds of voices simultaneously. Now also provides long distance carrier for TV in partnership with microwave beams.

Transistor. Tiny solid-state device uses extremely small amounts of power to amplify signals. Makes possible electronic telephone switching and much smaller hearing aids, radios, TV sets and electronic computers.

Dial system "brain and memory." Takes over your call and sees that you are connected in the best and quickest way. Newest example: Direct Distance Dialing from home telephones to any part of the nation



Waveguide. Hollow conductor transmits high-frequency waves. From this came the "pipe" circuits that are essential to radar and very short-wave radio communications.

Microwaves. Bell Laboratories developed long distance microwave transmission. It operates by focusing radio beams from station to station, carries cross-country telephony and TV.

Radio astronomy. This great new science began in the study of radio interference at Bell Laboratories . . . with the tremendous discovery that radio waves emanate from the stars.

BELL TELEPHONE LABORATORIES

WORLD CENTER OF COMMUNICATIONS RESEARCH AND DEVELOPMENT

Mobile "telephone exchange on wheels," built by Stromberg-Carlson, a division of General Dynamics Corp., is loaded on "piggyback" type freight car in Erie Railroad yards, Rochester, N. Y., for shipment to West Coast. Complete automatic telephone exchange is installed in large 37-foot highway transport trailer.

on a temporary basis, as in a seasonal resort area or a military encampment, or in a rapidly-growing suburban community. They also provide a means of quickly re-establishing communications in a disaster area where telephone exchanges have been wiped out by such events as tornadoes, floods, earthquakes or fires.

The exchanges are engineered and built to be compatible with all standard telephone systems in this country, using the conventional seven-digit dialing system. They are designed to operate on standard 110-volt alternating current, but also are equipped with batteries that provide an emergency power supply to keep the exchange operating for several hours, should the regular power source fail.

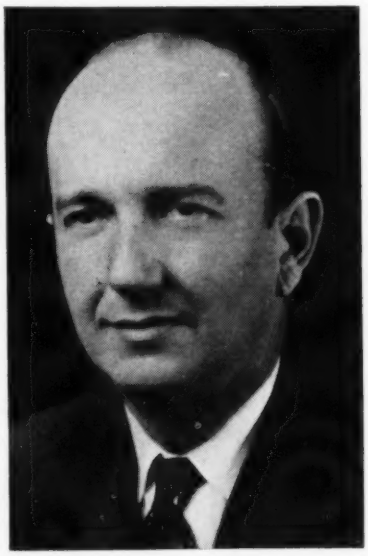
In arranging to obtain the special "piggyback" flatcars for the shipment of these trailers, Erie Railroad officials in Rochester explained that this shipment differs from the conventional "piggyback" shipment in one respect.

Normally, they said, "piggyback" freight is loaded into a trailer supplied by the railroad, hauled to its destination by rail and truck, and then unloaded from the trailer when it reaches the consignee.

However, in this instance not only the cargo, but the trailer, too, is delivered to the consignee. Because of this the shipment of these trailers is handled at regular freight rates, and not at the special "piggyback" rate, they pointed out.

Gould Appoints C. I. Simms Manager of Utility Sales

The appointment of Carson I. Simms as manager of utility sales for the industrial division, has been announced by Gould-National Batteries, Inc., Trenton, N. J.



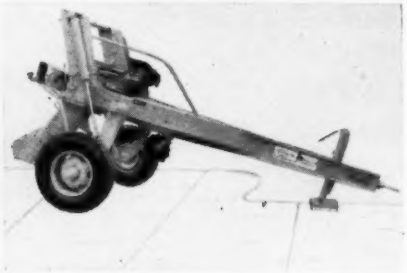
C. I. SIMS

Mr. Simms has served as a southern sales representative for Gould since 1951, and in his present position will supervise activities in the application of batteries to telephone service, electric light and power.

A Marine Corps veteran, Simms was employed as a sales engineer with the Whitin Machine Works after graduating from North Carolina college and later served as engineer for the War Production Board.

Lay Cable the Modern Way—

Ryan Underground Wire and Cable Layers



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Will handle all types and sizes to 3¼" diam. up to 42" depth. Electric brakes for highway travel optional. Av. Operating Cost 1c to 3c per ft. From $7,000.

ECONOMICAL—

Companies and contractors, both large and small in the U. S. and foreign countries have learned how they can increase profits, do the job in a fraction of the time by use of Ryan Cable Layers. Join them today!

FOR DIRECT BURIAL OF TELEPHONE OR ELECTRIC CABLES—

Now a size and type to fit your requirements.

All size machines equipped with the Ryan patented blade—your assurance against damaged cable.

NEW TRACTOR MOUNTED—

Will handle all types and sizes to ¾" diam., 18" to 24" deep. Can provide for additional depth. Ideal for farm lines, housing projects. Front mounted hydraulic reel carrier optional. Av. Operating cost less than 1c per ft. From $5,500 including tractor.

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100 years of service to linemen, electricians and industry is back of this new Pocket Tool Guide No. 100. A copy will be sent to you on request, without obligation.

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IN THE NATION'S CAPITAL

Concluded from page 18

ent there are seven television channels in Los Angeles offering about 40,000 hours of free entertainment in a year. Subscription television would add only about 2,000 hours to this total. Since these programs would not come over one of the channels now in use, the viewer still would be able to select any one of the seven free channels if that were his preference.

Free television is already having its troubles with high budget shows. It is also having trouble with poor-quality program in which the tragedy turns out to be comical and the comedians turn out to be tragic. Closed-circuit TV may not be the answer for all these problems. But whatever the answers, some kind of subscription TV seems inevitable.

And, unless the FCC gets a move on, in granting permission for the broadcast version, it looks as if the telephone industry may be due to pick up a nice piece of business by hooking up with the closed-circuit variety.

Of course, it could all turn out to be merely a flash in the picture tube. But as long as a dollar is a dollar, it is not likely that the telephone industry will remain coldly indifferent.

Glen L. Grawols Retires From Automatic Electric

Glen L. Grawols has retired from Automatic Electric Co.

Comptroller, treasurer, vice president and director are some of the titles Mr. Grawols has held during his career

G. L. GRAWOLS

with Automatic Electric which began in 1928. Prior to that time, he served as public accounting manager with Arthur Andersen & Co. in Chicago.

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— because PORTER COHARDITE-INSULATED ELECTRIC WIRE CUTTERS are built to meet the exacting safety and work-speed demands of Utility men. Center cut jaws easily cut insulated soft to medium hard wires, copper wire and medium hard steel wires up to ½". Rugged, hot-molded, special semi-hard rubber (Cohardite) handles, assure top toughness, high dielectric strength — and resist oxidation and chemicals. Each tool factory-tested to 20,000 volts.

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Shear-action cutter — for general cutting of all soft or hard steel cable or wire rope up to ¾". Notched jaws lock cable during cut, minimizing deforming.

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Designed for cutting soft, non-steel power cables, insulated or not, up to 1⅜" O.D. Jaws pass each other for clean cutting. A must for every efficient utility crew.

WRITE for folder showing many other needed utility company cutting tools.

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Somerville 43, Mass.

Born on a farm near Davison, Mich., he attended high school there, later entered Hillsdale College where he received his B. A. degree, and took postgraduate work at the University of Michigan and Northwestern University.

Mr. Grawols expects to divide his time between his homes in Evanston, Ill., and Deerfield Beach, Fla. He will continue to maintain offices at 332 S. Michigan Ave. in Chicago from where his various charitable, political education and personal business activities will be conducted.

Sperry Rand Names Dr. Fry Executive, Engineering Head

Dr. Thornton C. Fry has been appointed vice president and director of Univac Engineering for the Remington Rand Division of Sperry Rand Corp., it was announced by M. N. Rand, executive vice president and general manager.

DR. T. C. FRY

Dr. Fry was formerly assistant to the president of Bell Telephone Laboratories and in his new position with Remington Rand he will direct all research, development and product planning of commercial and military Univac systems and equipment.

Since leaving the Bell Telephone System in 1956, Dr. Fry has been a consultant to The International Telephone & Telegraph Corp. and Remington Rand, and is well known in both academic and industrial fields. He is a graduate of Findlay College and later studied at the University of Wisconsin where he received his Ph.D. in mathematics. During World War II he was a member of the Fire Control Division of the National Defense Research Committee and deputy chief of its Applied Mathematics Panel. He

(Please turn to page 62)

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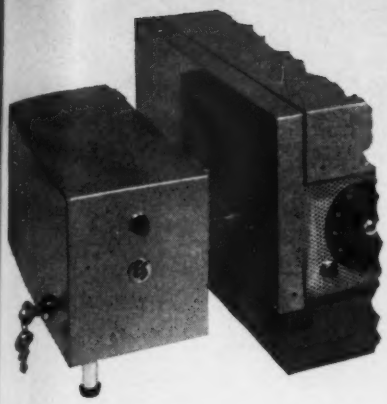
MODEL DCR-1

PROVIDES A COMPLETE TELEPHONE ANSWERING SERVICE FOR YOUR SUBSCRIBERS AND BRINGS YOU A STEADY FLOW OF REVENUE

Telephone companies now providing the *Electronic Secretary* find that revenue is literally *rolling in!* Use of the *Electronic Secretary* in both the home and the office has been a great money-saving item for subscribers—and they're glad to pay well for this service. (It saves calls, too, that would otherwise be unanswered!)

With the *Electronic Secretary* your subscriber no longer worries about missing important phone calls. It will answer his phone courteously, dozens of times a day. It works around the clock, records name, number and message, or tells the caller to call another number—a complete secretarial service! A wonderful source of revenue for the telephone company! For complete information call your Automatic representative or write to Automatic Electric Sales Corporation, Northlake, Illinois.

XUM



Remote call back addition for model DCR-1 Electronic Secretary. Subscriber hears recorded messages by transmitting a tone signal over a remote phone. Machine then switches to normal operation.

Tape adapter for Model DCR-1 Electronic Secretary. Direct replacement unit normally furnished with Model DCR-1. Records outgoing messages. Uses microphone, endless tape cartridge (1½ min. to 3 min.).

Model T-t Electronic Secretary. Answers telephone in subscriber's own voice by means of endless tape cartridge. (Capacity 30 sec. to 2½ min.). Ideal where messages change frequently.

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A member of the General Telephone System –
One of America's great communications systems

GENERAL TELEPHONE SYSTEM

Model TR Electronic Secretary. Answers telephone with pre-recorded disc and gives messages varying from 15 sec. to 2½ min. in length. For subscriber who doesn't change messages frequently.

has been awarded the Presidential Certificate of Merit for these activities.

In scientific circles, Dr. Fry is best known as an expert on the Mathematical Theory of Probability and especially in its application to various communication problems. He is the author of a book on this subject, titled "Probability and Its Engineering Uses."

Dr. Fry is a Fellow of the American Institute of Electrical Engineers, the American Physical Society and the Institute of Mathematical Statistics. He has been a vice president of the American Mathematical Society and of the Mathematical Association of America. He is a member of the Executive Board of Sigma Psi and holds membership in several other honorary and professional societies.

Dr. Fry will have his headquarters at the division's executive offices, 1 Atlantic Street, Stamford, Conn.

Philco Awarded $10,000,000 Radio Relay Contract

Philco's government and industrial division has received a contract for approximately 10 million dollars to build radio relay units and associated parts for the Army Signal Supply Agency.

These FM multi-band units are used as connecting stations for multi-channel field telephone circuits where laying of telephone cable is not practical, such as over water or rough terrain.

Radio relay equipment, which Philco's government and industrial division is building for the Army Signal Supply Agency, is shown in operation in a field communications center during the Army's recent exercise "King Cole" in Louisiana. Checking one of the relay units is SFC Harold P. Hansen, Little Falls, Minn., of Co. E, 53rd Signal Bn.

Each unit has a range of 30 miles in an unobstructed line of sight path and transmits radio signals in the 225-400 megacycle frequency range. As many as eight hops can be used in a single communications system.

To meet field requirements, the equipment is both portable and transportable and is designed for many years of military service under all types of climatic conditions.

All major electronic components are assembled in shock-mounted, rain-tight cases to withstand rough handling and truck transportation over unimproved roads or rough terrain. The 45-foot antenna mast is divided into nine easily assembled sections.

If necessary, the equipment can be transported by "manpower" to a remote location, since two men can carry any one piece of the communications system. Individual pieces of equipment weigh 100 pounds or less.

Cases also are equipped with "stacking bars" which interlock to prevent sliding when one case is stacked upon another.

The autotransformer allows the units to operate on either 115 or 230 volts, 60 cycle ac power source. A fast acting switch permits the changing from one power source to another without any interruption in messages.

Built-in test facilities warn the operators of any breakdown in the equipment. The antenna filter increases the selectivity of the receivers and trans-

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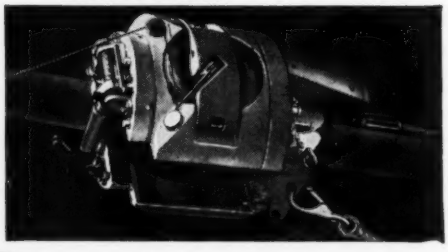

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mitters by reducing interference of unwanted signals.

Also, the operational controls, cable connections, alarms and safety switches are functionally placed for optimum operating efficiency.

Sufficient spare parts are included with the packaged units to guarantee a high level of maintenance at the operating sites. Corrosion resistant materials are used almost exclusively for structural parts.

FCC Gives Type Acceptance To Lenkurt's Microtel

A new 6,000-megacycle microwave system developed by Lenkurt Electric Co., San Carlos, Cal., has been "type accepted" by the Federal Communications Commission for use in the common carrier band, 5925-6425 megacycles.

The Type 74 system, trade-named Microtel, was accepted under Part 21 of FCC rules, which covers the technical requirements common carrier microwave systems must meet before licenses will be granted for their use. Type acceptance is not required at present for use of microwave systems in public safety.

Microtel is designed to provide up to 360 voice channels, over distances of several hundred miles, with three RF channels operating and one in standby. Over shorter distances, the system will carry 720 voice channels.

Uses of the Lenkurt equipment range from high channel-density systems for inter-city commercial telephony or military defense networks to industrial communications systems of as few as four channels.

The first type acceptance granted by the FCC for common carrier microwave equipment was for Lenkurt's 72 systems earlier this year.

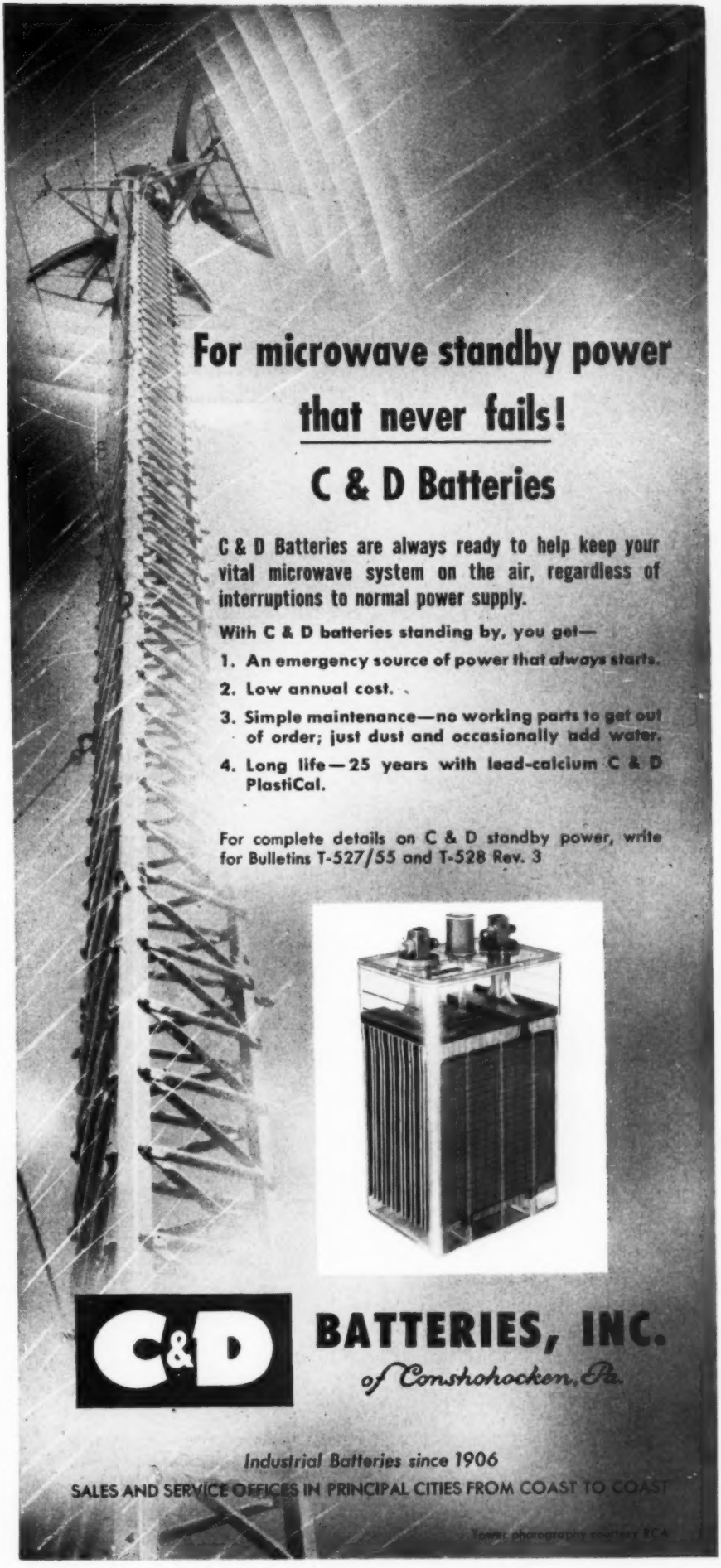
•

Let Them Know

"Your Senators and Representatives —when they are called upon to make decisions on important national issues —cannot truly represent you unless they know your views on those issues —and your reasons."—ARCH N. BOOTH, *executive vice president, Chamber of Commerce of the United States.*

View of Public Relations

"Public relations—human relations; there is actually very little difference between them—only the difference we allow there. And to keep that difference to its absolute minimum is a job for all of us . . ."—DORE SCHARY, former *chief of production, Metro-Goldwyn-Mauer Studios.*


For microwave standby power that never fails!
C & D Batteries
C & D Batteries are always ready to help keep your vital microwave system on the air, regardless of interruptions to normal power supply.
With C & D batteries standing by, you get—
1. An emergency source of power that always starts.
2. Low annual cost.
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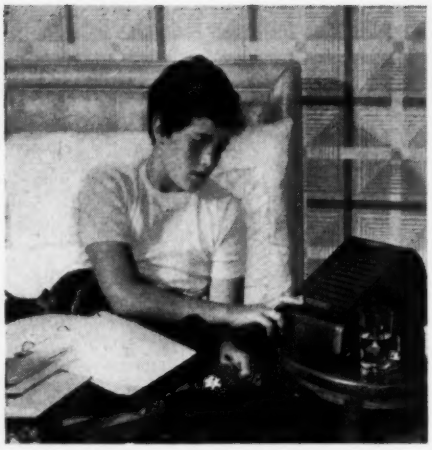


LEFT: Home station unit used in Executone school-to-home education system at bedside of stricken student. RIGHT: Portable classroom station used in Executone school-to-home system in actual use. Bedridden student at home is able to hear classroom discussion through Executone educational system.

Executone to be Distributed By Automatic Electric

The school-to-home educational system for shut-ins developed and manufactured by Executone, Inc., is now being distributed by Automatic Electric Sales Corp. to the Independent telephone industry.

A direct telephone line, with special equipment at each end, makes two-way communication possible between home or hospital and the class room.

With his home station, the shut-in hears everything spoken in the class room and recites in turn.

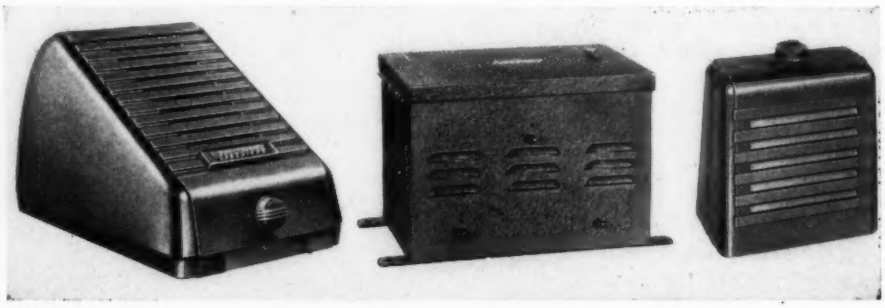
The portable class room station brings his voice to the teacher and others in the class room.

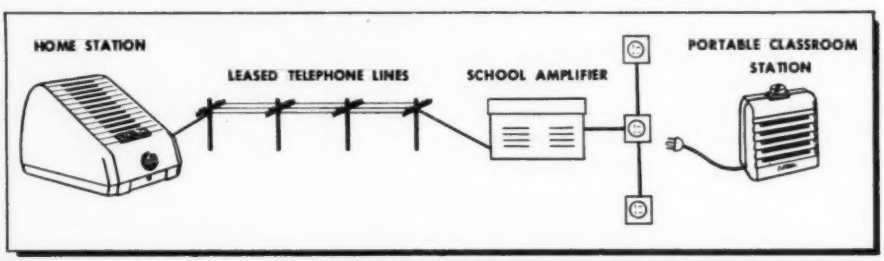
Home or hospital-bound elementary, high school, and college students with cardiac, orthopedic, muscular, fracture, contagious and other disabilities can continue their classes by these means.

Telephone companies normally can provide this service for from $15 to $25 per month, depending upon the distance and the number of class room outlets.

Although the equipment is being offered as another in the growing number of special telephone services, available to the public, a principal value to the telephone company is good will and improved public relations. "Providing this service to a shut-in almost always results in favorable publicity to the local exchange," telephone companies say.

Although the cost of this service is usually paid for out of regular school funds, special state-aid reimbursement is available for it in many states. In addition, local civic and social service organizations frequently contribute towards its cost.





Executone school-to-home educational system (above) which is now being distributed by Automatic Electric Sales Corp. to the Independent telephone industry. Diagram shows how equipment is linked in typical installation.

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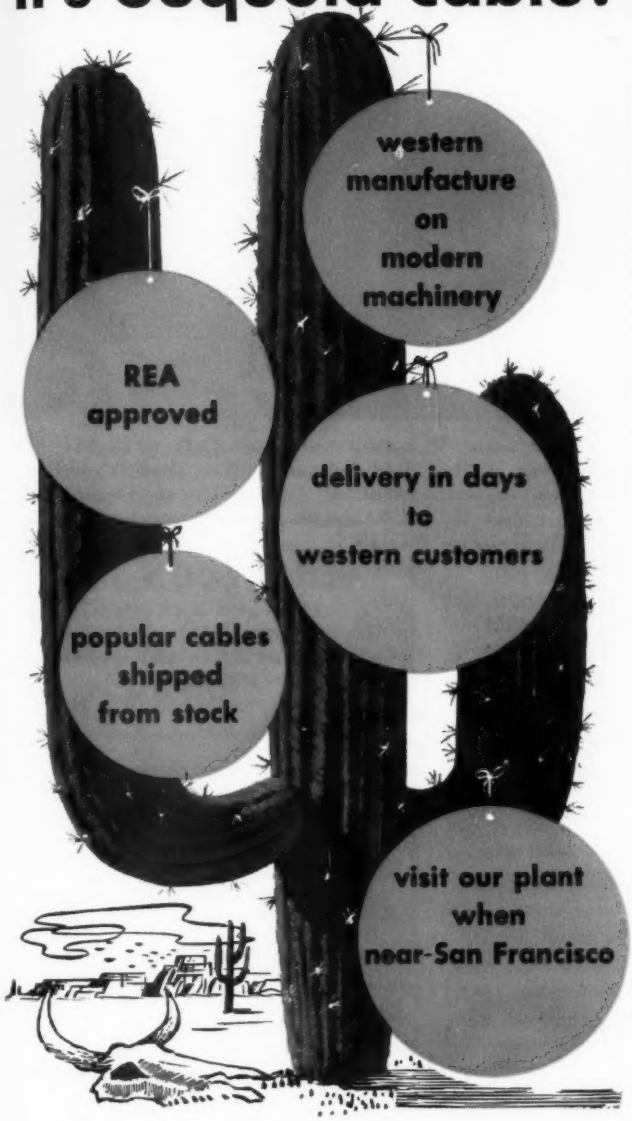
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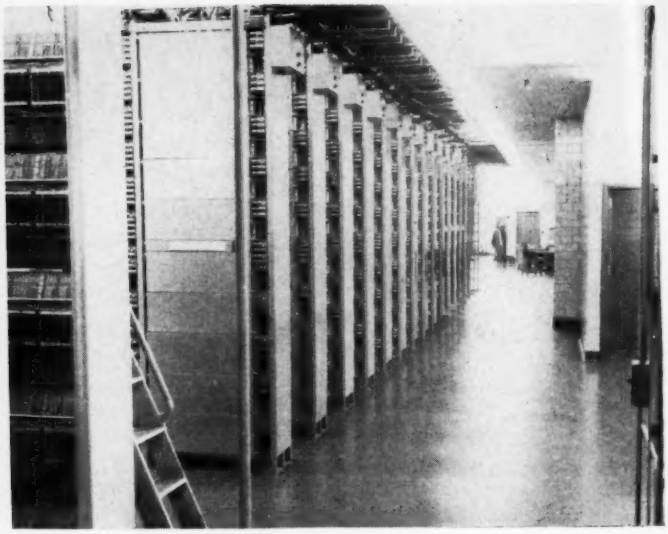

LEFT PHOTO: Telephone officials discuss new crossbar system minutes after Mansfield cut-over. Left to right: Hans Kraepelien, president of North Electric Co.; Gustav Hirsch, vice president of Mansfield Telephone Co.; Hans Thorelli, executive vice president of L. M. Ericsson Co.; Russell Bucek,installation superintendent of Gustav Hirsch Organization; R. E. Johnson, chief equipment engineer of Gustav Hirsch Organization; and R. B. Wiseman, North's telephone division manager. RIGHT PHOTO: North by-path crossbar line group and group selector line-up in Mansfield equipment room.

Mansfield, O., Cut Over To Dial Operation

An 8,000-line by-path crossbar automatic switching system, manufactured by North Electric Co., has been placed into service for the Mansfield (O.) Telephone Co.

The Mansfield crossbar system is the second of this new type of switching equipment to be cut over by North in the past six months.

Utilizing 8,000 lines for 22,000 subscribers, Mansfield's new system required the transformation of all telephone numbers to the 2-5 numbering system. This new main exchange is known as the LAfayette exchange.

The new system is designed to accommodate all the forward steps in telephony, including terminal-per-station, compatibility with other telephone systems, automatic toll ticketing, traffic recording, automatic routing, and other features of the future.

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"Although our business, like most others, has felt the full effects of inflation and rising costs, telephone rates have been increased much less than the price of most products. Before World War II, more than 2 per cent of family income was spent for local telephone service; today, less than one per cent is required. A home telephone today costs less a day than a package of cigarettes, a quart of milk, or a loaf of bread."—J. D. PORTER, *assistant vice president of revenue requirements, Southern Bell Telephone & Telegraph Co.*

The Ground and the Clouds

"One who is a doer only acts either blindly or under compulsion of others. . . . Valid opinion must be accompanied by a sense of grounded reality. Inventors and scientists reach out a little further than the others, but are chained to the past and to the present. Those who reach too far and too unwisely become the crackpots that inhabit every day and age."—DEANE W. MALLOTT, *president, Cornell University.*

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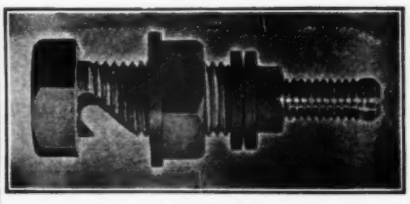

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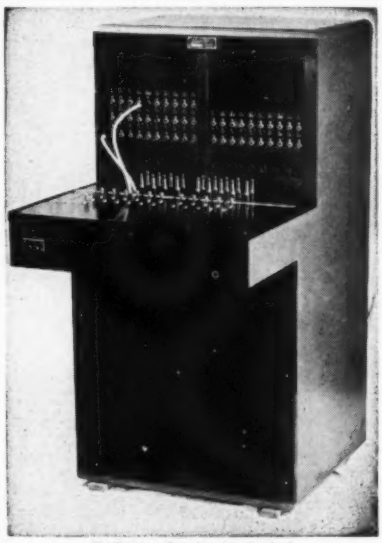

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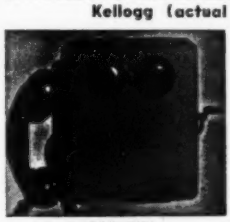

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